



The Pilot's Manual

Commercial Pilot Syllabus

by Jackie Spanitz

Seventh Edition

A Flight & Ground Training Course for
Commercial Pilot Airplane Certification
based on *The Pilot's Manual: Ground School*



ASA-PM-S-C7-PD

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About This Syllabus

Course Objective:

The objective of this syllabus is for the student to acquire the necessary aeronautical skill, knowledge and experience to meet the requirements of a Commercial Pilot certificate with an Airplane category rating and a Single-Engine Land class rating.

Prerequisites:

The student must be able to read, speak, write and understand the English language, meet the physical standards for a second-class medical certificate, and possess a valid private pilot certificate with an instrument rating (or be concurrently enrolled in an instrument rating course). The student must pass the instrument rating practical test prior to completing the Commercial Pilot Certification course. To meet the experience requirements of a 14 CFR §141 Commercial certificate, the student must have completed the Private Pilot Certificate Course, and the Instrument Rating Course prior to beginning this Commercial Pilot Certification Course. The student must be 18 years old at the time of the practical test to gain certification.

Experience Requirements for a Commercial Certificate Include:

190 hours of flight time (250 hours for 14 CFR §61 programs)

100 hours of ground training (no minimum time is stipulated for 14 CFR §61 programs)

	<i>Flight Training</i>	<i>Ground Training</i>
Private Certification Course	35.0 hours	35.0 hours
Instrument Rating Course	35.0 hours	30.0 hours
Commercial Certification Course	<u>120.0 hours</u>	<u>35.0 hours</u>
Total	190.0 hours	100.0 hours

Note: ground training consists of classroom + preflight + postflight briefings.

Commercial Pilot Certification Course:

The Commercial certificate is made up of 2 requirements: Aeronautical Skill and Aeronautical Knowledge. This syllabus is written to satisfy §141 requirements. The syllabus is in four Stages, each containing six Modules. Each stage must be completed in ____ days, not to be more than 90 days. Each Module contains both a flight and ground lesson. This presents an integrated flight training process and will promote easier learning and a more efficient flight training program. Ideally, the ground lesson will be completed prior to the flight. Each flight lesson must include a pre- and post-flight briefing.

Testing Procedures:

Each module contains a reading assignment associated with the ground training program. The review questions following each chapter will test the student's understanding of the material covered throughout the ground lesson, and must be answered prior to moving on to the next module. A Stage Exam is included with each stage, testing the student on both the ground and flight training material covered throughout the stage. This exam must be passed with a minimum score of 80%, and reconciled to 100%, to proceed to the next Stage.

It is essential that the objective of each module be accomplished before moving on to the next module.

Minimum Requirements:

This is the time necessary to qualify for §141 operations, meeting the 35 hours of ground instruction, and the 120 hours of flight time. Many factors play into the finishing flight time: frequency of flying, cooperative weather, airplane and instructor scheduling, and lapses in the flight training process. It is recommended the student fly at least twice a week. This type of schedule produces the most efficient training, and cuts down on review time. If there

is an extended lapse in between flights, it may be necessary to review maneuvers; use the optional review flights accompanying each Stage for this purpose (this will allow the student to continue following the syllabus, which is necessary for a §141 program). The student should feel comfortable performing each task in all previous modules before progressing to the next stage. If student exceeds more than ____ hours of the minimum recommended time allotted per module, the chief flight instructor must be informed per the §141 school certificate.

Note to instructors: instructors are responsible for ensuring the completion standards have been. It may require multiple meetings and/or flights for the student to complete all tasks to the defined standards.

Instruction in a pilot ground trainer that meets the requirements of §141.41(a) may be credited for a maximum of 30 percent of the total flight training hour requirements. Instruction in a pilot ground trainer that meets the requirements of §141.41(b) may be credited for a maximum of 20 percent of the total flight training hour requirements. When a ground training device is used, the ideal sequence is to learn in the ground training device and practice in the airplane.

Required Materials for the Commercial Pilot Certification Course:

- *The Pilot's Manual: Ground School* (#ASA-PM-2)

Recommended Materials for the Commercial Pilot Certification Course:

- *The Pilot's Manual: Flight School* (#ASA-PM-1)
- ASA Student Flight Record (#ASA-SFR-IC)
- FAA Commercial Pilot Airman Certification Standards (referred to as ACS) (#ASA-ACS-7)
- ASA FAR/AIM (#ASA-FR-AM-BK, *updated annually*)
- ASA Commercial Pilot Test Prep (#ASA-TP-C, *updated annually*)
- ASA Flight computer (*E6-B, CX-2 Pathfinder*)
- ASA Plotter (student's choice)
- ASA Flightlogs for cross-country flights (#ASA-FP)
- ASA *Commercial Oral Exam Guide* (#ASA-OEG-C)
- Charts for the training operations area
- Chart Supplement

The syllabus uses *The Pilot's Manual: Ground School* for the ground training program. The review following each chapter should be finished with the assigned reading. *The Pilot's Manual: Flight School* is recommended for use in enhancing the flight training program. Both books contain an index which will help pinpoint the material for the subject you are working on. ASA's *Commercial Pilot Test Prep* is also recommended to enhance the program. The prep will ensure the student is completely prepared for the FAA Knowledge Exam upon completion of the course. Instructors using this syllabus must ensure current Airman Certification Standards are upheld and *Airplane Flying Handbook* (FAA-H-8083-3) procedures are maintained at all times.

If you have any comments or questions on how to best use this syllabus, please call ASA at 1-800-ASA-2-FLY. We will be happy to provide suggestions on how to tailor this syllabus to specifically meet your training needs. *Note to Instructors:* Answers to the Stage Exams are available to instructors by calling 1-800-ASA-2-FLY, or fax your request on letterhead to 1-425-235-0128.

Commercial Pilot Minimum Course Hours

For Part 141, Appendix D Compliance

These times are for student/instructor guidance only. They are a suggested time schedule which will ensure minimum flight and ground training compliance with §141.

Page		Dual Flight	Solo Flight	Dual Cross-Country	Solo Cross-Country	Dual Night	Solo Night	Dual Complex Aircraft	Solo Complex Aircraft	Instrument Instruction	** Ground Instruction
	Private Certification Course	20.0	15.0 †	3.5	1 X/C more than 100 NM, 3 points	3.0	2.0			3.3	35.0 + Exams
	Instrument Rating Course	35.0		7.5						35.0	30.0 + Exams
	Commercial Certification Course										
01	Stage 1										
02	Module 1	2.5	1.0							.4	2.0
03	Module 2	2.5	1.0							.4	1.5
04	Module 3	2.0	1.0							.4	1.0
05	Module 4	2.0	1.0							.4	1.0
06	Module 5	2.0	1.5							.4	1.0
07	Module 6	2.5 + Stage Check	1.5							.4	1.5 + Exam
08	* Review	1.5	1.5								1.5
09	Stage 2										
10	Module 1	2.5	7.0	2.5	7.0					.4	2.0
11	Module 2	2.5	8.0		8.0			1.0		.4	1.5
12	Module 3	2.0	8.0		8.0					.4	1.0
13	Module 4	2.0	8.0		8.0			1.0		.4	1.0
14	Module 5	2.0	7.0		7.0					.4	1.0
15	Module 6	2.5 + Stage Check	2.0							.4	1.5 + Exam
16	* Review	1.5	1.5								1.5
17	Stage 3										
18	Module 1	2.5	1.5					1.0		.4	2.0
19	Module 2	4.0	1.5	4.0		4.0		4.0		.8	1.5
21	Module 3	2.0	1.5						1.5	.4	1.0
22	Module 4	2.0	1.5						1.5	.4	1.0
23	Module 5	2.0	1.0						2.0	.4	1.0
24	Module 6	2.5 + Stage Check	1.5					1.5		.4	1.5 + Exam
25	* Review	1.5	1.5								1.5
26	Stage 4										
27	Module 1	2.5	1.5			1.0	1.5			.4	1.5
28	Module 2	2.0	1.5				1.5			.4	2.0
29	Module 3	2.0	2.0		2.0		2.0			.4	2.0
30	Module 4	2.0	1.5							.4	2.0
31	Module 5	2.0	1.5					1.5		.4	2.0
32	Module 6	2.5 + Stage Check	1.5							.4	1.5 + Exam
33	* Review	1.5	1.5								1.5
	TOTALS	110.0 + Stage Checks	80.0 ‡	17.5	40.0 + Private hours	8.0	7.0 + 10 TOL	10.0	5.0 + 10 TOL	48.3	100 + Exams

* Reviews are not necessary to meet §141 compliance, and are not counted in the TOTALS for the program. They are optional, and should be used if the student is not ready to move on to the next module.

** Ground instruction consists of classroom + preflight + postflight briefings.

† 14 CFR §141 requires 20 hours of dual flight, 5 hours of solo flight, and a total of 35 hours of flight time for the Private Pilot Certificate. 10 hours may be conducted dual or solo, at the instructor's discretion.

‡ Exact totals will vary with the discretionary 10 hours.

TOL: Takeoffs and Landings

These are the aeronautical knowledge subjects and flight tasks required for §141 compliance and where they are covered within this syllabus.

Part 141 Appendix D — Ground Training		Covered in Syllabus
1	Federal Aviation Regulations that apply to commercial pilot privileges, limitations, and flight operations	Stage 1, Modules 3, 5
2	Accident reporting requirements of the National Transportation Safety Board	Stage 1, Module 5
3	Basic Aerodynamics and the principles of flight	Stage 1, Modules 1 and 3
4	Meteorology, to include recognition of critical weather situations, windshear recognition and avoidance, and the use of aeronautical weather reports and forecasts	Stage 2, Modules 5 and 6 Stage 4, Modules 1, 2, 3, 6
5	Safe and efficient operation of aircraft	Stage 1, Module 2
6	Weight and balance computations	Stage 2, Module 2
7	Use of performance charts	Stage 3, Modules 3, 4, 6
8	Significance and effects of exceeding aircraft performance limitations	Stage 3, Modules 3, 4, 6
9	Use of aeronautical charts and a magnetic compass for pilotage and dead reckoning	Stage 2, Modules 1, 2, 4, 6
10	Use of air navigation facilities	Stage 2, Modules 3, 4, 6
11	Aeronautical decision making and judgment	Stage 1, Modules 4, 6
12	Principles and functions of aircraft systems	Stage 3, Module 2
13	Maneuvers, procedures, and emergency operations appropriate to the aircraft	Stage 1, Modules 2, 3
14	Night and high-altitude operations	Stage 3, Modules 2, 3
15	Descriptions of and procedures for operating within the National Airspace System	Stage 2, Modules 1, 6

Part 141 Appendix D – Flight Training		Covered in Syllabus
55 hours of flight training		Stages 1-4, all modules
↳ 10 hours instrument training		Stages 1-4, all modules
↳ 10 hours training in complex airplane		Stage 2, Modules 2 and 4 Stage 3, Modules 1, 2, and 6 Stage 4, Module 5
↳ 2-hour cross-country, one destination more than 100 NM from departure		Stage 2, Module 1
↳ 2-hour night cross-country, one destination more than 100 NM from departure		Stage 3, Module 2
↳ 3 hours of flight training in preparation for the practical test within 60 days preceding the date of the test		Stage 4, Module 4 and 6

Enrollment Certificate

This is to certify that

Student Name

is enrolled in the Federal Aviation Administration approved
Commercial Pilot Certification Course, conducted by

School and Certificate Number

Chief Instructor

Date of Enrollment

Graduation Certificate

This is to certify that

Pilot Name and Number

has satisfactorily completed each required stage of the approved
course of training including the tests for those stages, and has
received _____ hours of cross-country training.

_____ has graduated from the
Federal Aviation Administration approved **Commercial Pilot
Certification Course** conducted by

School and Certificate Number

Chief Instructor

Date of Graduation

Stage 1

Introduction to the Commercial Certificate

Objective

The objective of Stage 1 is for the student to become proficient in, and have an understanding of the following:



Ground Training

- Course objective
- School requirements, procedures, regulations
- Grading criteria
- Forces acting on an airplane
- Stability and control
- Airframe
- Flight instruments
- Basic flight maneuvers
- Flight information
- Flight physiology
- Regulations



Flight Training

- Flight training process
- Training airplane
- Preflight
- Certificates and documents, including minimum equipment list
- Steep turns
- Steep spirals
- Chandelles
- Lazy eights
- Eights-on- pylons
- Maneuvering during slow flight
- Stall series: power-on, power-off, and accelerated
- Spin awareness
- Normal and crosswind takeoff, climb, approach and landing
- Soft-field takeoff, climb, approach, and landing
- Short-field takeoff, climb, approach, and landing
- Power-off 180° accuracy approach and landing
- Go-around/rejected landing procedures
- Aeromedical factors

Completion Standards

Stage 1 is complete when the student achieves the objective of each module, and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Student shall score at least 80% on the Stage 1 Exam, and all deficient areas shall be reconciled to 100%. Student shall have a second-class medical certificate upon completion of this stage.

Stage 1 / Module 1



Ground Training

Objective:

For the student to be introduced to the Commercial Pilot Certification program, and learn the flight school requirements, procedures, regulations, and grading criteria. Student shall also review stability and control and the forces acting on an airplane.

Content:

- ___ Review course and objectives
- ___ School requirements, procedures, regulations
- ___ Grading criteria, expectations of student
- ___ Review objective of Stage 1
- The forces acting on an airplane*
 - ___ Weight
 - ___ Lift
 - ___ Bernoulli's Principle
 - ___ dynamic and static pressure
 - ___ airspeed
 - ___ airfoil shape
 - ___ aerodynamic force
 - ___ pressure distribution and CP movement
 - ___ Drag
 - ___ total drag
 - ___ parasite drag
 - ___ skin-friction drag
 - ___ form drag
 - ___ interference drag
 - ___ induced drag
 - ___ angle-of-attack
 - ___ wing design
 - ___ lift and drag ratio
 - ___ wing flaps
 - ___ leading-edge devices
 - ___ Thrust
 - ___ propeller motion
 - ___ forces on a propeller blade
 - ___ propeller efficiency
 - ___ controllable-pitch propellers
 - ___ takeoff effects of propellers
 - ___ propeller torque effect
 - ___ gyroscopic effect
 - ___ P-factor
- Stability*
 - ___ static and dynamic stability
 - ___ stability vs. maneuverability
 - ___ airplane equilibrium
 - ___ pitching moments
 - ___ longitudinal, directional, and lateral stability
- Control*
 - ___ elevator
 - ___ ailerons
 - ___ rudder
 - ___ control effectiveness

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

The Pilot's Manual: Ground School, Chapters 1 and 2

Minimum 141 Requirements:

Dual, Local 2.5 hours flight (.4 instrument)

Solo, Local 1.0 hour flight(s)

Ground instruction 2.0 hours



Flight Training

Objective:

For the student to be introduced to the commercial course and training airplane, and gain proficiency in preflight, steep turns, steep spirals, slow flight, stalls, and normal and crosswind takeoffs and landings.

Content:

Dual Flight (2.5 hours)

- ___ Discussion of the flight training process
- ___ Introduction to the training airplane
- ___ Preflight, including certificates, documents and minimum equipment list
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Normal/crosswind approach and landing
- ___ Postflight procedures
- ___ Instrument cockpit check

Solo Flight(s) (1.0 hour)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Normal/crosswind approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 150 feet altitude, ± 15 degrees heading, and ± 15 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

The Pilot's Manual: Flight School

Stage 1 / Module 1

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 1 / Module 2

Minimum 141 Requirements:

Dual, Local 2.5 hours flight (.4 instrument)

Solo, Local 1.0 hour flight(s)

Ground instruction 1.5 hours



Ground Training

Objective:

For the student to review the airplane's airframe and flight instruments.

Content:

Airframe

- ___ Fuselage
- ___ Wings
- ___ Empennage
- ___ Flight controls
- ___ Landing gear
- ___ Engine and propeller

Flight instruments

- ___ Pressure instruments
- ___ Pitot-static system
- ___ Airspeed indicator
- ___ Altimeter
- ___ Vertical speed indicator
- ___ Gyroscopic instruments
- ___ Turn coordinator/turn indicator
- ___ Attitude indicator
- ___ Heading indicator
- ___ Magnetic compass

The airplane

- ___ Safe and efficient operation of aircraft
- ___ Emergency operations appropriate to the aircraft

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 4 and 7



Flight Training

Objective:

For the student to review the aeromedical factors of flight, gain additional experience in steep turns, slow flight, stalls, and soft-field takeoffs and landings, and be introduced to chandelles.

Content:

Dual Flight (2.5 hours)

- ___ Discussion of aeromedical factors of flight
- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Soft-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Soft-field approach and landing
- ___ Postflight procedures
- ___ Instrument approach procedures

Solo Flight(s) (1.0 hour)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Soft-field takeoff and climb
- ___ Normal/crosswind takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Soft-field approach and landing
- ___ Normal/crosswind approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 150 feet altitude, ± 15 degrees heading, and ± 15 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 1 / Module 2

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 1 / Module 3



Ground Training

Objective:

For the student to understand the basic flight maneuvers required of the Commercial pilot, and the tools available for obtaining flight information.

Content:

Basic flight maneuvers

- ___ Straight-and-level flight
- ___ Climbing and descending
- ___ Turning and load factor
- ___ Stalling
- ___ Spinning

Flight information

- ___ NOTAMs, TFRs
- ___ Chart Supplement
- ___ Aeronautical Information Manual
- ___ Federal Aviation Regulations
- ___ Pilot/Controller Glossary
- ___ Advisory Circulars

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 3

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Local 1.0 hour flight(s)

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to continue practicing steep turns, slow flight, stalls, chandelles, and short-field takeoffs and landings, and be introduced to lazy eights.

Content:

Dual Flight (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Short-field approach and landing
- ___ Postflight procedures
- ___ Missed approaches

Solo Flight(s) (1.0 hour)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 150 feet altitude, ± 15 degrees heading, and ± 15 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 1 / Module 3

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 1 / Module 4



Ground Training

Objective:

For the student to gain an understanding of flight physiology.

Content:

Flight physiology

- ☐ Am I fit to fly?
 - ☐ physical fitness
 - ☐ mental fitness
 - ☐ medical checks
 - ☐ medication
 - ☐ upper respiratory tract problems
 - ☐ corrective lenses
 - ☐ food poisoning
 - ☐ alcohol
 - ☐ smoking
 - ☐ fatigue and sleep deprivation
 - ☐ blood donation
- ☐ Low temperatures
- ☐ Respiration
 - ☐ increased altitude
 - ☐ hypoxia
 - ☐ carbon monoxide poisoning
 - ☐ hyperventilation
 - ☐ decompression sickness
- ☐ Balance
 - ☐ sensing acceleration
 - ☐ inner ear balance mechanism
 - ☐ motion sickness
 - ☐ vertigo
 - ☐ spatial disorientation
 - ☐ sensory illusions
- ☐ Vision
 - ☐ structure of the eye
 - ☐ adaptation of eyes to darkness
 - ☐ scanning for other aircraft
 - ☐ visual illusions on approach
- ☐ Aeronautical decision making and judgement

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 12

Stage 1 / Module 4

Date of Completion: _____

Signature: _____

Time Flown: _____

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Local 1.0 hour flight(s)

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to gain proficiency in normal/crosswind/soft-field/short-field takeoff, climb, approach, and landings, steep turns, maneuvering during slow flight, stalls, chandelles, lazy eights, and go-around/rejected landing procedures, and be introduced to eights-on-pylons, and the power-off 180° accuracy approach and landing.

Content:

Dual Flight (2.0 hours)

- ☐ Preflight
- ☐ Checklist use
- ☐ Taxi
- ☐ Runway incursion avoidance procedures
- ☐ Normal/crosswind takeoff and climb
- ☐ Steep spirals
- ☐ Maneuvering during slow flight
- ☐ Stalls series: power-on, power-off, and accelerated
- ☐ Chandelles
- ☐ Lazy eights
- ☐ Eights-on-pylons
- ☐ Maneuvering under instrument conditions
- ☐ Power-off 180° accuracy approach and landing
- ☐ Go-around/rejected landing procedures
- ☐ Normal/crosswind approach and landing
- ☐ Postflight procedures

Solo Flight(s) (1.0 hour)

- ☐ Preflight
- ☐ Checklist use
- ☐ Taxi
- ☐ Runway incursion avoidance procedures
- ☐ Normal/crosswind takeoff and climb
- ☐ Short-field takeoff and climb
- ☐ Soft-field takeoff and climb
- ☐ Steep turns
- ☐ Steep spirals
- ☐ Maneuvering during slow flight
- ☐ Stalls series: power-on, power-off, and accelerated
- ☐ Chandelles
- ☐ Lazy eights
- ☐ Eights-on-pylons
- ☐ Power-off 180° accuracy approach and landing
- ☐ Go-around/rejected landing procedures
- ☐ Normal/crosswind approach and landing
- ☐ Short-field approach and landing
- ☐ Soft-field approach and landing
- ☐ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 150 feet altitude, ± 15 degrees heading, and ± 15 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 1 / Module 5



Ground Training

Objective:

For the student to learn the regulations pertinent to the commercial pilot and commercial flight operations.

Content:

Regulations

- ___ 14 CFR §1 Definitions and abbreviations
- ___ 14 CFR §61 Pilot certification
- ___ 14 CFR §91 General operating and flight rules
- ___ NTSB §830
- ___ 14 CFR §125
- ___ 14 CFR §135

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 19

Student should obtain second-class medical certificate

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Local 1.5 hours flight(s)

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to gain additional proficiency in takeoffs and landings, go-around/rejected landing procedures, steep turns, slow flight, stalls, chandelles, lazy eights, and eights-on-pylons, and be introduced to spin awareness.

Content:

Dual Flight (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Soft-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Spin awareness
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Soft-field approach and climb
- ___ Postflight procedures
- ___ Partial panel

Solo Flight(s) (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 100 feet altitude, ± 10 degrees heading, and ± 10 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 1 / Module 5

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 1 / Module 6 and Stage Check



Ground Training

Objective:

For the student to review all Stage 1 objectives in preparation for the Stage 1 Exam.

Content:

- _____ The forces acting on an airplane
- _____ Stability and control
- _____ Airframes
- _____ Flight instruments
- _____ Basic flight maneuvers
- _____ Flight physiology
- _____ Aeronautical decision making
- _____ Regulations

Completion Standards:

Stage 1 Exam must be passed with a minimum score of 80%, and reconciled to 100%.

Assignment:

Stage 1 Exam

Minimum 141 Requirements: Dual, Local 2.5 hours flight
(.4 instrument)
Solo, Local 1.5 hours flight(s)
Stage check
Ground instruction 1.5 hours
Stage exam



Flight Training

Objective:

For the student to review takeoffs, landings, steep turns, chandelles, lazy eights, eights-on-pylons, slow flight, stalls, and go-around/rejected landing procedures. For the Stage Check, student should demonstrate skill in the following areas according to the completion standards.

Content:

Dual Flight (2.5 hours)

- _____ Preflight
- _____ Confirm student's second-class medical
- _____ Checklist use
- _____ Taxi
- _____ Runway incursion avoidance procedures
- _____ Soft-field takeoff and climb
- _____ Steep turns
- _____ Steep spirals
- _____ Maneuvering during slow flight
- _____ Stalls series: power-on, power-off, and accelerated
- _____ Spin awareness
- _____ Chandelles
- _____ Lazy eights
- _____ Eights-on-pylons
- _____ Maneuvering under instrument conditions
- _____ Power-off 180° accuracy approach and landing
- _____ Go-around/rejected landing procedures
- _____ Soft-field approach and climb
- _____ Postflight procedures
- _____ Instrument approach

Solo Flight(s) (1.5 hours)

- _____ Preflight
- _____ Checklist use
- _____ Taxi
- _____ Runway incursion avoidance procedures
- _____ Normal/crosswind takeoff and climb
- _____ Soft-field takeoff and climb
- _____ Short-field takeoff and climb
- _____ Steep turns
- _____ Steep spirals
- _____ Maneuvering during slow flight
- _____ Stalls series: power-on, power-off, and accelerated
- _____ Chandelles
- _____ Lazy eights
- _____ Eights-on-pylons
- _____ Power-off 180° accuracy approach and landing
- _____ Go-around/rejected landing procedures
- _____ Normal/crosswind approach and landing
- _____ Soft-field approach and landing
- _____ Short-field approach and landing
- _____ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 100 feet altitude, ± 10 degrees heading, and ± 10 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School; Commercial Pilot Test Prep, Chapters 1, 3 and 10

Stage 1 / Module 6

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage Exam Score: _____

Stage Check Successful: _____

Optional **Stage 1 Review**

Lesson Time:

Dual 1.5 hours flight, or whatever is necessary to meet objective

Solo 1.5 hours flight, or whatever is necessary to meet objective

Ground instruction 1.5 hours, or whatever is necessary to meet objective



Flight Training

Objective:

For the student to review all Stage 1 tasks and meet all objectives.

Content:

Dual Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Soft-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Spin awareness
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering under instrument conditions
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Soft-field approach and climb
- ___ Postflight procedures

Solo Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 100 feet altitude, ± 10 degrees heading, and ± 10 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Optional **Stage 1 Review**

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 2

Cross-Country Flight Experience

Objective

The objective of Stage 2 is for the student to become proficient in and have an understanding of the following:



Ground Training

- Charts and airspace
- Visual navigation fundamentals
- Using the flight computer
- Weight and balance
- Navigation systems: ground-based, satellite-based, radar, transponder, DME
- Flight planning
- Enroute navigation
- Operational weather factors



Flight Training

- Cross-country flight planning
- National airspace system
- Pilotage and dead reckoning
- Navigation systems and radar services
- Diversion
- Lost procedures

Completion Standards

Stage 2 is complete when the student achieves the objective of each module, and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Student shall score at least 80% on the Stage 2 Exam and all deficient areas shall be reconciled to 100%.

Stage 2 / Module 1



Ground Training

Objective:

For the student to gain an understanding of charts and airspace and visual navigation fundamentals.

Content:

____ Review objective of Stage 2

VFR charts

- ____ Sectional charts
- ____ VFR terminal area charts

Airspace

- ____ Class A
- ____ Class B
- ____ Class C
- ____ Class D
- ____ Class E
- ____ Class G
- ____ Special use airspace
- ____ Other airspace

Visual navigation fundamentals

- ____ Horizontal navigation
 - ____ types of navigation
 - ____ direction and speed combined
- ____ Vertical navigation
 - ____ VFR cruise altitude
 - ____ safety altitude
- ____ Time

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 20, 21, and 23

Minimum 141 Requirements:

Dual, Cross-country 2.5 hours flight (.4 instrument)
Solo, Cross-country 7.0 hours flight(s)
Ground instruction 2.0 hours



Flight Training

Objective:

For the student to gain experience in cross-country operations, including a landing at least 100 NM from the departure airport, cross-country flight planning, the national airspace system, pilotage and dead reckoning, navigation systems and radar services, and diversion and lost procedures.

Content:

Dual Flight (2.5 hours)

- ____ Cross-country flight planning
- ____ Review national airspace system
- ____ Preflight
- ____ Checklist use
- ____ Taxi
- ____ Runway incursion avoidance procedures
- ____ Short-field takeoff and climb
- ____ Soft-field takeoff and climb
- ____ Pilotage and dead reckoning
- ____ Maneuvering under instrument conditions
- ____ Navigation systems and radar services
- ____ Diversion procedures
- ____ Lost procedures
- ____ Simulated engine failure
- ____ Simulated electrical failure
- ____ Simulated radio failure
- ____ Simulated instrument failure
- ____ Short-field approach and landing
- ____ Soft-field approach and landing
- ____ Postflight procedures

Solo Flight(s) (7.0 hours)

- ____ Cross-country flight planning
- ____ Preflight
- ____ Checklist use
- ____ Taxi
- ____ Runway incursion avoidance procedures
- ____ Short-field takeoff and climb
- ____ Soft-field takeoff and climb
- ____ Pilotage and dead reckoning
- ____ Ground-based navigation
- ____ Radar services
- ____ Short-field approach and landing
- ____ Soft-field approach and landing
- ____ Postflight procedures

Completion Standards:

This module is complete when the student has gained cross-country flight experience including a landing at least 100 NM from the departure airport, while maintaining the navigation log, keeping flight within ± 100 feet altitude, ± 10 degrees heading, ± 10 knots airspeed, the enroute checkpoints and destination within 3 minutes of the ETA, and can verify the airplane's position within 1 nautical mile of the planned route at all times.

Recommended Reading:

Flight School

Stage 2 / Module 1

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 2 / Module 2



Ground Training

Objective:

For the student to review weight-and-balance and using the flight computer.

Content:

Using the flight computer

- ___ The flight computer for flight planning
 - ___ finding TAS
 - ___ finding heading and groundspeed
 - ___ finding the time en route and fuel requirements
 - ___ finding wind components
 - ___ conversions
- ___ Calculating the wind velocity in flight

Weight-and-balance

- ___ Weight
 - ___ empty weight
 - ___ gross weight
 - ___ weight of fuel and oil
 - ___ other weight limitations
- ___ Balance
 - ___ moment of a force
 - ___ balancing a loaded airplane
 - ___ finding the position of the CG
 - ___ airplane datums
 - ___ effect of CG position on airplane handling
 - ___ finding the CG of a loaded airplane
 - ___ index units
- ___ Graphical presentation of weight-and-balance data
- ___ Tabular presentation of weight-and-balance data
- ___ Finding the moment index for an item
- ___ Weight-shift calculations
- ___ Weight-change calculations
- ___ CG movement
- ___ Weight-shift and weight-change by formula
- ___ Mean aerodynamic chord

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 24 and 11

Stage 2 / Module 2

Date of Completion: _____

Signature: _____

Time Flown: _____

Minimum 141 Requirements:

Dual, Complex aircraft 2.5 hours flight (.4 instrument)

Solo, Cross-country 8.0 hours flight(s)

Ground instruction 1.5 hours



Flight Training

Objective:

For the student to gain additional experience in solo cross-country operations, and be introduced to dual flight in a complex aircraft.

Content:

Dual Flight (2.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Runway incursion avoidance procedures
- ___ Cockpit management
- ___ Engine starting
- ___ Taxiing
- ___ Normal/crosswind takeoff and climb
- ___ Cruise procedures
- ___ Power settings
- ___ Constant-speed propeller use
- ___ Retractable landing gear and flaps use
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Postflight procedures
- ___ Holding patterns

Solo Flight(s) (8.0 hours)

- ___ Cross-country flight planning
- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Short-field takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Pilotage and dead reckoning
- ___ Ground-based navigation
- ___ Radar services
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student has gained cross-country flight experience including a landing at least 50 NM from the departure airport, while maintaining the navigation log, keeping flight within ± 100 feet altitude, ± 10 degrees heading, ± 10 knots airspeed, the enroute checkpoints and destination within 3 minutes of the ETA, and can verify the airplane's position within 1 nautical mile of the planned route at all times. Student should demonstrate a private pilot proficiency level while performing basic flight operations in a complex aircraft.

Recommended Reading:

Flight School

Stage 2 / Module 3



Ground Training

Objective:

For the student to review electronic navigation, including VOR, ADF, radar, the transponder, DME, and RNAV.

Content:

Electronic Navigation

- ___ VOR
- ___ VOR cockpit instruments
- ___ Operational use of the VOR
- ___ Intercepting course with a VOR
- ___ Tracking with a VOR
- ___ NDB
- ___ ADF
- ___ ADF cockpit displays
- ___ Operational use of the ADF
- ___ Radar
- ___ Transponder
- ___ DME
- ___ Pseudo-VORTACs (RNAV)
- ___ GPS
- ___ Bearing changes, time and distance to station

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 27

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Cross-country 8.0 hours flight(s)

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to gain additional experience in solo cross-country operations, and review commercial maneuvers during a dual flight.

Content:

Dual Flight (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Soft-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering solely by reference to instruments
- ___ Soft-field approach and landing
- ___ Postflight procedures

Solo Flight(s) (8.0 hours)

- ___ Cross-country flight planning
- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Short-field takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Steep spirals
- ___ Pilotage and dead reckoning
- ___ Ground-based navigation
- ___ Radar services
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student has gained cross-country flight experience including a landing at least 50 NM from the departure airport, while maintaining the navigation log, the enroute checkpoints and destination within 3 minutes of the ETA, and can verify the airplane's position within 1 nautical mile of the planned route at all times. Student should keep flight within ± 100 feet altitude, ± 10 degrees heading, ± 10 knots airspeed while performing the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 2 / Module 3

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 2 / Module 4



Ground Training

Objective:

For the student to review cross-country flight planning and enroute navigation.

Content:

Flight planning

- ___ Weather and operational considerations
- ___ Pre-flight planning

Enroute navigation

- ___ Compensating for wind effect
- ___ Airmanship
- ___ The flight sequence
 - ___ departure from an airport
 - ___ cruise
 - ___ map-reading in flight
 - ___ chart orientation in the airplane
 - ___ log keeping
- ___ Navigation techniques
 - ___ position lines
 - ___ off-course HDG corrections
 - ___ correction angle
 - ___ ratio method
 - ___ inverse-ratio method
- ___ Diversions
 - ___ enroute diversions
 - ___ diversion to an alternate airport
- ___ Navigation operations
 - ___ visibility
 - ___ uncertain of position
 - ___ mental navigation checks
 - ___ low-level navigation
 - ___ ELT

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 25 and 26

Stage 2 / Module 4

Date of Completion: _____

Signature: _____

Time Flown: _____

Minimum 141 Requirements:

Dual, Complex aircraft 2.0 hours flight (.4 instrument)

Solo, Cross-country 8.0 hours flight(s)

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to gain additional experience in solo cross-country operations and dual complex aircraft operations.

Content:

Dual Flight (2.0 hours)

- ___ Discussion of performance and limitations
- ___ Discussion of system operations
- ___ Preflight
- ___ Checklist use
- ___ Runway incursion avoidance procedures
- ___ Cockpit management
- ___ Engine starting
- ___ Taxiing
- ___ Short-field takeoff and climb
- ___ Cruise procedures
- ___ Power settings
- ___ Constant-speed propeller use
- ___ Retractable landing gear and flaps use
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Maneuvering solely by reference to instruments
- ___ Simulated engine failure
- ___ Simulated systems and equipment failure
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Short-field approach and landing
- ___ Postflight procedures

Solo Flight(s) (8.0 hours)

- ___ Cross-country flight planning
- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Short-field takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Steep spirals
- ___ Pilotage and dead reckoning
- ___ Ground-based navigation
- ___ Radar services
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student has gained cross-country flight experience including a landing at least 50 NM from the departure airport, while maintaining the navigation log, keeping flight within ± 100 feet altitude, ± 10 degrees heading, ± 10 knots airspeed, the enroute checkpoints and destination within 3 minutes of the ETA, and can verify the airplane's position within 1 nautical mile of the planned route at all times. Student should demonstrate a private pilot proficiency level while performing the maneuvers listed in a complex aircraft.

Recommended Reading:

Flight School

Stage 2 / Module 5



Ground Training

Objective:

For the student to review operational weather factors.

Content:

Operational weather factors

- ☐ Icing
 - ☐ structural icing
 - ☐ induction icing
 - ☐ instrument icing
- ☐ Visibility
 - ☐ particles in the air
 - ☐ inversions and reduced visibility
 - ☐ condensation
 - ☐ fog
- ☐ Turbulence
 - ☐ localized friction effects
 - ☐ winds associated with mountains
 - ☐ flying in turbulence
 - ☐ clear air turbulence
 - ☐ classification of turbulence
- ☐ Windshear
- ☐ Thunderstorms
- ☐ Microburst

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 17

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Long-cross-country 7.0 hours flight

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to obtain the solo long-cross-country requirements required for the Commercial certificate, and to review the commercial maneuvers during dual flight.

Content:

Dual Flight (2.0 hours)

- ☐ Preflight
- ☐ Checklist use
- ☐ Taxi
- ☐ Runway incursion avoidance procedures
- ☐ Short-field takeoff and climb
- ☐ Steep turns
- ☐ Steep spirals
- ☐ Maneuvering during slow flight
- ☐ Stalls series: power-on, power-off, and accelerated
- ☐ Chandelles
- ☐ Lazy eights
- ☐ Eights-on-pylons
- ☐ Maneuvering solely by reference to instruments
- ☐ Short-field approach and landing
- ☐ Postflight procedures

*Solo Flight (7.0 hours)**

- ☐ Cross-country flight planning
- ☐ Preflight
- ☐ Checklist use
- ☐ Taxi
- ☐ Runway incursion avoidance procedures
- ☐ Short-field takeoff and climb
- ☐ Soft-field takeoff and climb
- ☐ Steep spirals
- ☐ Pilotage and dead reckoning
- ☐ Ground-based navigation
- ☐ Radar services
- ☐ Short-field approach and landing
- ☐ Soft-field approach and landing
- ☐ Postflight procedures

* Flight must include landings at a minimum of three points, one of which is at least 250 nautical miles from the original departure point (except for Hawaii; one segment of at least 150 NM).

Completion Standards:

This module is complete when the student has gained cross-country flight experience including at least three landings, one of which is at least 250 NM from the departure airport, while maintaining the navigation log, the enroute checkpoints and destination within 3 minutes of the ETA, and can verify the airplane's position within 1 nautical mile of the planned route at all times. Student should keep flight within ± 100 feet altitude, ± 10 degrees heading, ± 10 knots airspeed while performing the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 2 / Module 5

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 2 / Module 6 and Stage Check



Ground Training

Objective:

For the student to review Stage 2 objectives in preparation of the Stage 2 Exam.

Content:

- ___ Charts
- ___ Airspace
- ___ Visual navigation fundamentals
- ___ Using the flight computer
- ___ Weight-and-balance
- ___ Electronic navigation
- ___ Flight planning
- ___ Enroute navigation
- ___ Operational weather factors

Completion Standards:

Stage 2 Exam must be passed with a minimum score of 80% and reconciled to 100%.

Assignment:

Stage 2 Exam

Minimum 141 Requirements: Dual, Local 2.5 hours flight (.4 instrument)
Solo, Local 2.0 hours flight(s)
Stage check
Ground instruction 1.5 hours
Stage exam



Flight Training

Objective:

For the student to review commercial maneuvers according to commercial pilot Airman Certification Standards. For the Stage Check, student should demonstrate skill in the following areas according to the completion standards.

Content:

Dual Flight (2.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Soft-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Spin awareness
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering under instrument conditions
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Soft-field approach and climb
- ___ Postflight procedures

Solo Flight(s) (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 100 feet altitude, ± 10 degrees heading, and ± 10 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School; Commercial Pilot Test Prep, Chapters 5, 6 and 7

Stage 2 / Module 6

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage Exam Score: _____

Stage Check Successful: _____

Optional **Stage 2 Review**

Lesson Time:

Dual 1.5 hours flight, or whatever is necessary to meet objective
Solo 1.5 hours flight, or whatever is necessary to meet objective
Ground instruction 1.5 hours, or whatever is necessary to
meet objective



Flight Training

Objective:

For the student to review all Stage 2 tasks and meet all objectives.

Content:

Dual Flight (1.5 hours)

- ☐ Preflight
- ☐ Checklist use
- ☐ Taxi
- ☐ Runway incursion avoidance procedures
- ☐ Soft-field takeoff and climb
- ☐ Steep turns
- ☐ Steep spirals
- ☐ Maneuvering during slow flight
- ☐ Stalls series: power-on, power-off, and accelerated
- ☐ Spin awareness
- ☐ Chandelles
- ☐ Lazy eights
- ☐ Eights-on-pylons
- ☐ Maneuvering under instrument conditions
- ☐ Ground-based navigation
- ☐ Power-off 180° accuracy approach and landing
- ☐ Go-around/rejected landing procedures
- ☐ Soft-field approach and climb
- ☐ Postflight procedures

Solo Flight(s) (1.5 hours)

- ☐ Preflight
- ☐ Checklist use
- ☐ Taxi
- ☐ Runway incursion avoidance procedures
- ☐ Normal/crosswind takeoff and climb
- ☐ Soft-field takeoff and climb
- ☐ Short-field takeoff and climb
- ☐ Steep turns
- ☐ Steep spirals
- ☐ Maneuvering during slow flight
- ☐ Stalls series: power-on, power-off, and accelerated
- ☐ Chandelles
- ☐ Lazy eights
- ☐ Eights-on-pylons
- ☐ Ground-based navigation
- ☐ Power-off 180° accuracy approach and landing
- ☐ Go-around/rejected landing procedures
- ☐ Normal/crosswind approach and landing
- ☐ Soft-field approach and landing
- ☐ Short-field approach and landing
- ☐ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 100 feet altitude, ± 10 degrees heading, and ± 10 knots airspeed while demonstrating the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Optional **Stage 2 Review**

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 3

Complex Aircraft and Night Flying Experience

Objective

The objective of Stage 3 is for the student to become proficient in and have an understanding of the following:



Ground Training

- Complex aircraft:
 - engines
 - engine operation
 - systems
 - airplane performance factors
 - takeoff and landing performance
 - enroute performance
- Airports and airport operations



Flight Training

- Complex airplane operations:
 - performance and limitations
 - operation of systems
 - preflight inspection
 - cockpit management
 - taxiing
 - slow flight
 - stall series
 - steep turns
 - steep spirals
 - normal, crosswind, short and soft takeoffs and landings
 - power-off 180° accuracy approach and landing
 - airport and runway markings and lighting
 - after landing
 - parking and securing
- Supplemental oxygen (discussion)
- Pressurization (discussion)
- Night flight operations

Completion Standards

Stage 3 is complete when the student achieves the objective of each module, and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Student shall score at least 80% on the Stage 3 Exam, and all deficient areas shall be reconciled to 100%.

Stage 3 / Module 1



Ground Training

Objective:

For the student to gain an understanding of engines and engine operations, with special attention to complex aircraft application.

Content:

___ Review objective of Stage 3

Engine

- ___ Four-stroke engine cycle
- ___ Valves and valve timing
- ___ Ignition
- ___ Starter
- ___ Exhaust system
- ___ Carburetor
 - ___ accelerator pump
 - ___ idling system
 - ___ fuel and air mixture control
 - ___ abnormal combustion
 - ___ carburetor ice
- ___ Fuel injection systems

Engine operation

- ___ Starting the engine
- ___ Stopping the engine
- ___ Changing power setting with a constant-speed propeller
- ___ Engine handling
- ___ Rough running
- ___ Cross-checking engine instruments
- ___ Taxiing
- ___ Engine failure in flight
- ___ Engine fire in flight
- ___ Engine fire on startup

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 5

Minimum 141 Requirements:

Dual, Complex aircraft 2.5 hours flight (.4 instrument)

Solo, Local 1.5 hours flight(s)

Ground instruction 2.0 hours



Flight Training

Objective:

For the student to review commercial maneuvers during solo flight and gain additional experience in dual complex aircraft operations, including a maximum weight takeoff and landing.

Content:

Dual Flight (2.5 hours)

- ___ Discussion of supplemental oxygen and pressurization
- ___ Preflight
- ___ Checklist use and cockpit management
- ___ Taxiing
- ___ Normal, maximum-weight, takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Maneuvering solely by reference to instruments
- ___ Simulated engine failure
- ___ Simulated system and equipment failure
- ___ Emergency descent
- ___ Normal approach and landing
- ___ Parking and securing
- ___ Postflight procedures

Solo Flight(s) (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can maintain flight within ± 100 feet altitude, ± 10 degrees heading, ± 10 knots airspeed while performing the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 3 / Module 1

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 3 / Module 2



Ground Training

Objective:

For the student to gain an understanding of systems and airplane performance factors, with special attention to complex aircraft applications.

Content:

Aircraft systems

- ___ Fuel system
- ___ Oil system
- ___ Cooling system
- ___ Electrical system
- ___ Vacuum system

Airplane performance factors

- ___ Airworthiness
- ___ Airframe limitations
- ___ Air density

The airplane

- ___ Principles and functions of aircraft systems
- ___ Night operations

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 6, 8, and 19

Minimum 141 Requirements:

Dual, Cross-country, Night,
Complex aircraft 4.0 hours flight (.8 instrument)
Solo, Local 1.5 hours flight(s)
Ground instruction 1.5 hours



Flight Training

Objective:

For the student to gain the required experience of a night cross-country, in a complex aircraft during dual flight operations, and additional experience performing the commercial maneuvers.

Content:

*Dual Flight (4.0 hours)**

- ___ Discussion of night flying regulations
- ___ Cross-country planning
- ___ Preflight
- ___ Use of checklists and cockpit management
- ___ Normal/crosswind takeoff and climb
- ___ Steep spirals
- ___ Pilotage and dead reckoning
- ___ Navigation systems and radar services
- ___ Diversion and lost procedures
- ___ Simulated engine failure
- ___ Simulated systems and equipment failure
- ___ Emergency descent
- ___ Maneuvering under instrument conditions
- ___ Normal/crosswind approach and landing
- ___ Postflight procedures

* Night flight must include a landing at a point more than 100 miles from the point of departure.

Solo Flight(s) (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student has completed the required night cross-country in a complex aircraft. Student will continue practicing all commercial maneuvers according to the Commercial Airman Certification Standards. Upon completion of this module, student should receive the complex endorsement to conduct solo complex aircraft operations.

Recommended Reading:

Flight School

Stage 3 / Module 2

Date of Completion: _____

Signature: _____

Time Flown: _____

Endorsement for a pilot to act as PIC in a complex airplane: 14 CFR §61.31(e)

I certify that (First name, MI, Last name), (pilot certificate), (certificate number) has received the required training of § 61.31(e) in a (make and model of complex airplane). I have determined that he/she is proficient in the operation and systems of a complex airplane.

S/S [date] J. Jones 654321 CFI Exp. 03-31-19

Stage 3 / Module 3

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Complex aircraft 1.5 hours flight

Ground instruction 1.0 hour



Ground Training

Objective:

For the student to gain an understanding of takeoff and landing performance, specifically with reference to complex aircraft application.

Content:

Takeoff performance

- ___ Factors affecting takeoff performance
- ___ Takeoff distance graph
- ___ Different presentations of performance data

Landing performance

- ___ Factors affecting landing performance
- ___ Landing distance graph
- ___ Landing distance table
- ___ Wake turbulence
 - ___ avoiding wake turbulence
 - ___ jet blast
- ___ Ground effect
 - ___ increased lifting ability
 - ___ reduced drag
 - ___ ground effect during landing
 - ___ ground effect during takeoff
- ___ Windshear
 - ___ effects of windshear on an airplane
 - ___ overshoot and undershoot effect
- ___ Taxiing
- ___ Runway incursion avoidance procedures

Complex airplanes

- ___ High altitude operations

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 9 and 19



Flight Training

Objective:

For the student to demonstrate competency of commercial maneuvers during dual flight, and gain experience in solo complex aircraft operations.

Content:

Dual Flight (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering solely by reference to instruments
- ___ Short-field approach and landing
- ___ Postflight procedures

Solo Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Short-field takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Cruise procedures
- ___ Power setting and mixture control
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Normal/crosswind approach and landing
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can demonstrate commercial maneuvers according to the commercial Airman Certification Standards, and perform complex aircraft operations accurately and smoothly. Student should make 3 solo takeoffs and landings to a full stop in the complex aircraft.

Recommended Reading:

Flight School

Stage 3 / Module 3

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 3 / Module 4



Ground Training

Objective:

For the student to gain an understanding of enroute performance, specifically with reference to complex aircraft applications.

Content:

Enroute performance

- ___ Cruise altitude and power setting
- ___ Indicated outside air temperature
- ___ Presentation of performance data
- ___ Fuel consumption
- ___ Effect of wind in cruise
- ___ Climb performance
 - ___ maximum rate of climb
 - ___ cruise or normal climb
- ___ Cruise performance
 - ___ specific range
 - ___ flying for endurance

Airplane and pilot performance

- ___ Significance and effects of exceeding aircraft performance limitations

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 10

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Complex aircraft 1.5 hours flight

Ground instruction 1.0 hour



Flight Training

Objective:

For the student to demonstrate proficiency in the commercial maneuvers during a dual flight, and gain additional experience during solo complex aircraft operations.

Content:

Dual Flight (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Soft-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering solely by reference to instruments
- ___ Soft-field approach and landing
- ___ Postflight procedures

Solo Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Short-field takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Cruise procedures
- ___ Power setting and mixture control
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Normal/crosswind approach and landing
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can demonstrate commercial maneuvers according to the commercial Airman Certification Standards, and perform complex aircraft operations accurately and smoothly. Student should make 3 solo takeoffs and landings to a full stop in the complex aircraft.

Recommended Reading:

Flight School

Stage 3 / Module 4

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 3 / Module 5



Ground Training

Objective:

For the student to review airports and airport operations, with specific reference to complex aircraft applications.

Content:

Airports

- ___ Airport, runway, and taxiway signs, markings, and lighting
- ___ LAHSO
- ___ Radio communications and ATC light signals

Airport operations

- ___ Listening to the ATIS
- ___ Before taxiing
- ___ Standard traffic pattern
- ___ Legs of a traffic pattern
- ___ Wind effect in the traffic pattern
- ___ Departing the traffic pattern
- ___ Using the radio
- ___ Entering the traffic pattern
- ___ Airport radar services

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 22

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)
Solo, Complex aircraft 1.0 hour flight(s)
Ground instruction 1.0 hour



Flight Training

Objective:

For the student to demonstrate proficiency in the commercial maneuvers during a dual flight, and gain additional experience during solo complex aircraft operations.

Content:

Dual Flight (2.0 hours)

- ___ Preflight
- ___ Checklist use
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering solely by reference to instruments
- ___ Short-field approach and landing
- ___ Postflight procedures

Solo Flight(s) (1.0 hour)

- ___ Preflight
- ___ Checklist use
- ___ Normal takeoff and climb
- ___ Crosswind takeoff and climb
- ___ Short-field takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Cruise procedures
- ___ Power setting and mixture control
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Normal approach and landing
- ___ Crosswind approach and landing
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can demonstrate commercial maneuvers according to the commercial Airman Certification Standards, and perform complex aircraft operations accurately and smoothly. Student should make 4 solo takeoffs and landings to a full stop in the complex aircraft. Upon completion of this module, student will have the required 10 takeoffs and landings and the 5.0 hours of solo flight in a complex aircraft.

Recommended Reading:

Flight School

Stage 3 / Module 5

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 3 / Module 6 and Stage Check



Ground Training

Objective:

For the student to review Stage 3 objectives in preparation of the Stage 3 Exam.

Content:

- ___ Engines
- ___ Engine operation
- ___ Systems
- ___ Airplane performance factors
- ___ Takeoff and landing performance
- ___ Enroute performance
- ___ Airports and airport operations

Completion Standards:

Stage 3 Exam must be passed with a minimum score of 80%, and reconciled to 100%.

Assignment:

Stage 3 Exam

Minimum 141 Requirements: Dual, Complex aircraft 2.5 hours flight (.4 instrument)
Solo, Local 1.5 hours flight(s)
Stage check
Ground instruction 1.5 hours
Stage exam



Flight Training

Objective:

For the student to review complex aircraft operations and continue to practice the commercial maneuvers during solo flight. For the Stage Check, student should demonstrate skill in the following areas according to completion standards.

Content:

Dual Flight (2.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Cockpit management
- ___ Normal/crosswind takeoff and climb
- ___ Power setting and mixture control
- ___ Cruise procedures
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Maneuvering under instrument conditions
- ___ Unusual attitude recovery
- ___ Simulated engine failure
- ___ Simulated systems and equipment failure
- ___ Simulated instrument failure
- ___ Simulated fire in flight; Emergency descent
- ___ Normal/crosswind approach and landing
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around procedures
- ___ Postflight procedures

Solo Flight(s) (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can demonstrate complex airplane operations and commercial maneuvers, maintaining commercial pilot Airman Certification Standards.

Recommended Reading:

Flight School; Commercial Pilot Test Prep, Chapters 2 and 4

Stage 3 / Module 6

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage Exam Score: _____

Stage Check Successful: _____

Optional **Stage 3 Review**

Lesson Time:

Dual 1.5 hours flight, or whatever is necessary to meet objective
Solo 1.5 hours flight, or whatever is necessary to meet objective
Ground instruction 1.5 hours, or whatever is necessary to meet objective



Flight Training

Objective:

For the student to review all Stage 3 tasks and meet all objectives.

Content:

Dual Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use and cockpit management
- ___ Normal/crosswind takeoff and climb
- ___ Power setting and mixture control
- ___ Cruise procedures
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Maneuvering under instrument conditions
- ___ Unusual attitude recovery
- ___ Simulated engine failure
- ___ Simulated systems and equipment failure
- ___ Simulated instrument failure
- ___ Simulated fire in flight; Emergency descent
- ___ Normal/crosswind approach and landing
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around procedures
- ___ Postflight procedures

Solo Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can demonstrate complex airplane operations and commercial maneuvers, maintaining commercial pilot Airman Certification Standards.

Recommended Reading:

Flight School

Optional **Stage 3 Review**

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 4

Prep for Checkride

Objective

The objective of Stage 4 is for the student to become proficient in and have an understanding of the following:



Ground Training

- Heating effects in the atmosphere
- Wind
- Clouds and thunderstorms
- Air masses and frontal weather
- Weather reports and forecasts
- Commercial Airman Certification Standards
- Prep for oral portion of checkride



Flight Training

- Weather information
- Physiological aspects of night flying
- Lighting and equipment for night flying
- Emergency descent
- Emergency approach and landing
- Systems and equipment malfunctions
- Emergency equipment and survival gear
- The experience and knowledge required by the Commercial License
- All Commercial maneuvers and experience required by ACS
- Sign-off for the commercial checkride

Completion Standards

Stage 4 is complete when the student achieves the objective of each module, and can list or describe the correct process or reference for accomplishing elements, exercises and activities. Student shall score at least 80% on the Stage 4 Exam, and all deficient areas shall be reconciled to 100%. Students must take and pass the FAA Commercial Written Exam. At the completion of this stage, student is signed off to take the Commercial Pilot checkride.

Note: 3 hours must be dedicated to preparation for the practical test within 60 days preceding the date of the test for §141 compliance.

Stage 4 / Module 1



Ground Training

Objective:

For the student to gain an understanding of meteorology, specifically the heating effects in the atmosphere and wind.

Content:

___ Review objective of Stage 4

Atmosphere

- ___ Air density
- ___ Subdivision of the atmosphere
- ___ Air is a mixture of gases
- ___ Standard atmosphere
- ___ Heat exchange processes
 - ___ sun
 - ___ terrestrial re-radiation
 - ___ general circulation
 - ___ local heating and cooling
 - ___ local air movements
 - ___ temperature inversions

Wind

- ___ How wind is described
- ___ Causes of wind
- ___ Coriolis effect
- ___ Geostrophic wind
- ___ Gradient wind
- ___ Surface wind
- ___ Wind in the tropics
- ___ High-level weather
 - ___ tropopause
 - ___ jetstreams

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 13 and 14

Minimum 141 Requirements:

Dual, Night 2.5 hours flight (.4 instrument)

Solo, Night 1.5 hours flight

Ground instruction 1.5 hours



Flight Training

Objective:

For the student to gain additional night flight experience.

Content:

Dual Flight (2.5 hours)

- ___ Weather information
- ___ Discussion of physiological aspects of night flying
- ___ Discussion of lighting and equipment for night flying
- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Maneuvering solely by reference to instruments
- ___ Maneuvering under instrument conditions
- ___ Simulated emergency descent
- ___ Simulated emergency approach and landing
- ___ Simulated systems and equipment malfunction
- ___ Normal/crosswind approach and landing
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Postflight procedures

Solo Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Taxi
- ___ Runway incursion avoidance procedures
- ___ Normal/crosswind takeoff and climb (4)
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Steep turns
- ___ Steep spirals
- ___ Normal/crosswind approach and landing (4)
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Postflight procedures

Completion Standards:

This module is complete when the student can demonstrate correct operating procedures for night flying. Flight must be maintained within ± 100 feet altitude, ± 10 degrees heading, and ± 10 knots air-speed while performing the maneuvers listed in the content of this module.

Recommended Reading:

Flight School

Stage 4 / Module 1

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 4 / Module 2

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Local, Night 1.5 hours flight

Ground instruction 2.0 hours



Ground Training

Objective:

For the student to gain an understanding of meteorology, specifically clouds and thunderstorms, and air masses and frontal weather.

Content:

Clouds

- ____ Naming of clouds
- ____ Moisture in the atmosphere
- ____ Adiabatic processes
- ____ Formation of clouds
- ____ Precipitation from clouds
- ____ High-level clouds
- ____ Middle-level clouds
- ____ Low-level clouds

Thunderstorms

- ____ Life cycle of a thunderstorm
- ____ Severe thunderstorms
- ____ Danger of thunderstorms
- ____ Lifted index
- ____ Clouds at high levels
- ____ Airborne weather radar

Air masses

Frontal weather

- ____ Warm front
- ____ Cold front
- ____ Occluded front
- ____ Stationary front
- ____ Development and decay of fronts
- ____ Depressions, areas of low pressure
- ____ Anticyclones, areas of high pressure

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapters 15 and 16



Flight Training

Objective:

For the student to review commercial maneuvers and instrument flight, and for the student to gain additional solo-night experience.

Content:

Dual Flight (2.0 hours)

Note: Flight requires an instrument-rated aircraft.

- ____ Preflight
- ____ Cockpit management
- ____ VFR:
 - ____ Short-field takeoff and climb
 - ____ Steep turns
 - ____ Steep spirals
 - ____ Maneuvering during slow flight
 - ____ Stalls series: power-on, power-off, and accelerated
 - ____ Chandelles
 - ____ Lazy eights
 - ____ Eights-on-pylons
 - ____ Maneuvering solely by reference to instruments
 - ____ Short-field approach and landing
 - ____ Power-off 180° accuracy approach and landing
 - ____ Go-around/rejected landing procedures
- ____ IFR:
 - ____ VOR holding procedures
 - ____ VOR instrument approach
 - ____ Missed approach procedures
- ____ Postflight procedures

Solo Flight (1.5 hours)

- ____ Preflight
- ____ Checklist use
- ____ Normal/crosswind takeoff and climb (4)
- ____ Maneuvering during slow flight
- ____ Stalls series: power-on, power-off, and accelerated
- ____ Steep turns
- ____ Steep spirals
- ____ Normal/crosswind approach and landing (4)
- ____ Power-off 180° accuracy approach and landing
- ____ Go-around/rejected landing procedures
- ____ Postflight procedures

Completion Standards:

This module is complete when the student has gained additional solo night flying experience and has reviewed commercial maneuvers and instrument flying procedures. Commercial maneuvers must be performed according to Commercial Airman Certification Standards, and instrument flight must maintain specified minimums.

Recommended Reading:

Flight School

Stage 4 / Module 2

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 4 / Module 3



Ground Training

Objective:

For the student to review weather reports and forecasts.

Content:

___ Obtaining a weather briefing

Weather reports

___ Surface analysis charts

___ METAR

___ Pilot weather reports (PIREPs)

Weather forecasts

___ Low-level significant weather prognostic charts

___ Terminal aerodrome forecasts (TAF)

___ Graphical area forecasts (GFA)

___ Weather advisories

___ Winds and temperatures aloft forecasts (FB)

___ Convective outlook charts (AC)

___ Staying informed in the air

___ Constant pressure analysis charts

___ Other weather information

___ composite moisture stability chart

Completion Standards:

This module is complete when the student has successfully completed all review questions following the assigned reading.

Assignment:

Ground School, Chapter 18

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Cross-country, Night 2.0 hours flight

Ground instruction 2.0 hours



Flight Training

Objective:

For the student to gain experience in solo night cross-country operations, and additional proficiency in commercial maneuvers and instrument flight.

Content:

Dual Flight (2.0 hours)

Note: Flight requires an instrument-rated aircraft.

___ Preflight

___ Cockpit management

___ VFR:

___ Soft-field takeoff and climb

___ Steep turns

___ Steep spirals

___ Maneuvering during slow flight

___ Stalls series: power-on, power-off, and accelerated

___ Chandelles

___ Lazy eights

___ Eights-on-pylons

___ Maneuvering solely by reference to instruments

___ Soft-field approach and landing

___ Power-off 180° accuracy approach and landing

___ Go-around/rejected landing procedures

___ IFR:

___ Non-precision holding procedures

___ Non-precision instrument approach

___ Missed approach procedures

___ Postflight procedures

Solo Flight (2.0 hours)

___ Cross-country flight planning

___ Preflight

___ Checklist use

___ Normal/crosswind takeoff and climb (2)

___ Steep spirals

___ Cross-country procedures

___ Pilotage and dead reckoning

___ Ground-based navigation

___ Radar services

___ Normal/crosswind approach and landing (2)

___ Power-off 180° accuracy approach and landing

___ Go-around/rejected landing procedures

___ Postflight procedures

Completion Standards:

This module is complete when the student has gained additional solo night flying experience and has reviewed commercial maneuvers and instrument flying procedures. Commercial maneuvers must be performed according to commercial Airman Certification Standards, and instrument flight must maintain specified minimums. Upon completion of this module, student will have the required 5 hours of solo night flying experience with 10 takeoffs and landings (with each landing involving a flight with a traffic pattern) at an airport with an operating control tower, and 40 hours of solo cross-country experience.

Recommended Reading:

Flight School

Stage 4 / Module 3

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 4 / **Module 4**



Ground Training

Objective:

For the student to gain complete proficiency in all areas included in the Commercial Airman Certification Standards.

Content:

____ Review the Commercial Airman Certification Standards

Assignment:

Review the Commercial Airman Certification Standards

Minimum 141 Requirements:

Dual, Local 2.0 hours flight (.4 instrument)

Solo, Local 1.5 hours flight(s)

Ground instruction 2.0 hours



Flight Training

Objective:

For the student to gain proficiency in the commercial maneuvers and instrument flight operations. This module should be completed within 60 days of the practical test.

Content:

Dual Flight (2.0 hours)

Note: Flight requires an instrument-rated airplane

____ Preflight

____ Cockpit management

____ VFR:

____ Normal/crosswind takeoff and climb

____ Steep turns

____ Steep spirals

____ Maneuvering during slow flight

____ Stalls series: power-on, power-off, and accelerated

____ Chandelles

____ Lazy eights

____ Eights-on-pylons

____ Maneuvering solely by reference to instruments

____ Normal/crosswind approach and landing

____ Power-off 180° accuracy approach and landing

____ Go-around/rejected landing procedures

____ IFR:

____ Precision instrument approach

____ Missed approach procedures

____ Postflight procedures

Solo Flight(s) (1.5 hours)

____ Preflight

____ Checklist use

____ Normal/crosswind takeoff and climb

____ Soft-field takeoff and climb

____ Short-field takeoff and climb

____ Steep turns

____ Steep spirals

____ Maneuvering during slow flight

____ Stalls series: power-on, power-off, and accelerated

____ Chandelles

____ Lazy eights

____ Eights-on-pylons

____ Ground-based navigation

____ Power-off 180° accuracy approach and landing

____ Go-around/rejected landing procedures

____ Normal/crosswind approach and landing

____ Soft-field approach and landing

____ Short-field approach and landing

____ Postflight procedures

Completion Standards:

This module is complete when all the commercial maneuvers are completed according to ACS, and instrument flight maintains specified minimums.

Recommended Reading:

Flight School

Stage 4 / **Module 4**

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 4 / Module 5



Ground Training

Objective:

For the student to review all areas of aeronautical knowledge required of the Commercial certificate.

Content:

- ____ Review all Commercial Pilot subject matter from the Commercial Airman Certification Standards
- ____ Suggested review material: *Commercial Oral Exam Guide*

Completion Standards:

Review Commercial Airman Certification Standards in preparation of the checkride.

Assignment:

Suggested reading: review *Commercial Oral Exam Guide*

Minimum 141 Requirements:

Dual, Complex aircraft 2.0 hours flight (.4 instrument)

Solo, Local 1.5 hours flight(s)

Ground instruction 2.0 hours



Flight Training

Objective:

For the student to gain proficiency in the commercial maneuvers and complex aircraft operations.

Content:

Dual Flight (2.0 hours)

Note: Flight requires a complex, instrument-rated airplane

- ____ Preflight
- ____ Cockpit management
- ____ VFR:
 - ____ Normal/crosswind takeoff and climb
 - ____ Steep turns
 - ____ Steep spirals
 - ____ Maneuvering during slow flight
 - ____ Stalls series: power-on, power-off, and accelerated
 - ____ Chandelles
 - ____ Lazy eights
 - ____ Eights-on-pylons
 - ____ Maneuvering solely by reference to instruments
 - ____ Simulated engine failure
 - ____ Simulated systems and equipment failure
 - ____ Emergency descent
 - ____ Normal/crosswind approach and landing
 - ____ Power-off 180° accuracy approach and landing
 - ____ Go-around/rejected landing procedures
- ____ IFR:
 - ____ Simulated instrument failure
 - ____ Precision instrument approach
 - ____ Missed approach procedures
- ____ Postflight procedures

Solo Flight(s) (1.5 hours)

- ____ Preflight
- ____ Checklist use
- ____ Normal/crosswind takeoff and climb
- ____ Soft-field takeoff and climb
- ____ Short-field takeoff and climb
- ____ Steep turns
- ____ Steep spirals
- ____ Maneuvering during slow flight
- ____ Stalls series: power-on, power-off, and accelerated
- ____ Chandelles
- ____ Lazy eights
- ____ Eights-on-pylons
- ____ Ground-based navigation
- ____ Power-off 180° accuracy approach and landing
- ____ Go-around/rejected landing procedures
- ____ Normal/crosswind approach and landing
- ____ Soft-field approach and landing
- ____ Short-field approach and landing
- ____ Postflight procedures

Completion Standards:

This module is complete when all the commercial maneuvers are completed according to ACS, and instrument flight maintains specified minimums.

Recommended Reading:

Flight School

Stage 4 / Module 5

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage 4 / Module 6 and Stage Check



Ground Training

Objective:

For the student to review all Stage 4 objectives, in preparation of the Stage 4 Exam.

Content:

- ___ Heating effects in the atmosphere
- ___ Wind
- ___ Clouds and thunderstorms
- ___ Air masses and frontal weather
- ___ Weather reports and forecasts
- ___ Commercial Airman Certification Standards
- ___ Areas of knowledge required of the commercial pilot

Completion Standards:

Stage 4 Exam must be passed with a minimum score of 80%, and reconciled to 100%.

Assignment:

Stage 4 Exam

Minimum 141 Requirements: Dual, Local 2.5 hours flight (.4 instrument)
Solo, Local 1.5 hours flight(s)
Stage check
Ground instruction 1.5 hours
Stage exam



Flight Training

Objective:

For the student to review all the commercial pilot skill requirements. For the Stage Check, student should demonstrate skill in the following areas according to the completion standards. This module should be completed within 60 days of the practical test.

Content:

Dual Flight (2.5 hours)

Note: Flight requires an instrument-rated airplane

- ___ Cross-country flight planning (VFR, IFR)
- ___ Preflight
- ___ Compliance with ATC procedures and clearances
- ___ Intercept and track VOR radial and NDB bearing
- ___ Holding procedures
- ___ Simulated engine, instrument, and radio failure
- ___ Recover from unusual attitudes
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Maneuvering solely by reference to instruments
- ___ Normal/crosswind approach and landing
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Non-precision and precision approaches
- ___ Postflight procedures

Solo Flight(s) (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when all the maneuvers and areas of aeronautical knowledge are demonstrated according to the Commercial ACS.

Recommended Reading:

Flight School; Commercial Pilot Test Prep, Chapters 8, 9 and 11

Stage 4 / Module 6

Date of Completion: _____

Signature: _____

Time Flown: _____

Stage Exam Score: _____

Stage Check Successful: _____

Optional **Stage 4 Review**

Lesson Time:

Dual 1.5 hours flight, or whatever is necessary to meet objective
Solo 1.5 hours flight, or whatever is necessary to meet objective
Ground instruction 1.5 hours, or whatever is necessary to meet objective



Flight Training

Objective:

For the student to become proficient in all commercial maneuvers, in preparation for the checkride.

Content:

Dual Flight (1.5 hours)

Note: Flight requires an instrument-rated airplane

- ___ Cross-country flight planning (VFR, IFR)
- ___ Preflight
- ___ Instrument cockpit check
- ___ Compliance with ATC procedures and clearances
- ___ Intercept and track ground-based navigation system
- ___ Holding procedures
- ___ Simulated loss of communications
- ___ Simulated engine failure
- ___ Simulated instrument failure
- ___ Simulated radio failure
- ___ Recover from unusual attitudes
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Normal/crosswind approach and landing
- ___ Short-field approach and landing
- ___ Soft-field approach and landing
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Non-precision and precision approaches
- ___ Postflight procedures

Solo Flight (1.5 hours)

- ___ Preflight
- ___ Checklist use
- ___ Normal/crosswind takeoff and climb
- ___ Soft-field takeoff and climb
- ___ Short-field takeoff and climb
- ___ Steep turns
- ___ Steep spirals
- ___ Maneuvering during slow flight
- ___ Stalls series: power-on, power-off, and accelerated
- ___ Chandelles
- ___ Lazy eights
- ___ Eights-on-pylons
- ___ Ground-based navigation
- ___ Power-off 180° accuracy approach and landing
- ___ Go-around/rejected landing procedures
- ___ Normal/crosswind approach and landing
- ___ Soft-field approach and landing
- ___ Short-field approach and landing
- ___ Postflight procedures

Completion Standards:

This module is complete when all the commercial maneuvers are completed according to ACS.

Recommended Reading:

Flight School

Optional **Stage 4 Review**

Date of Completion: _____

Signature: _____

Time Flown: _____

1. Endorsement for aeronautical knowledge: 14 CFR §61.35(a)(1) and §61.123(c)

I certify that ____ (FN, MI, LN) ____ has received the required training of §61.125. I have determined that he/she is prepared for the (name the knowledge test).

S/S [date] J. Jones 654321 CFI Exp. 03-31-19

2. Endorsement for flight proficiency practical test 14 CFR §61.123(e) and §61.127

I certify that ____ (FN, MI, LN) ____ has received the required training of §61.127 and §61.129. I have determined that he/she is prepared for the (name the practical test).

S/S [date] J. Jones 654321 CFI Exp. 03-31-19

Confirm for the Checkride:

- ☐ 3 hours flight training dedicated to preparation for the practical test were flown within 60 days preceding the date of the test.
- ☐ Identification with photo and signature
- ☐ Pilot certificate current
- ☐ Current second-class medical (third-class for Practical Test, second-class to exercise privileges)
- ☐ Completed 8710-1 application with instructor's signature
- ☐ Computer test report
- ☐ Pilot logbook with instructor endorsements
- ☐ School graduation certificate
- ☐ Materials necessary for planning a cross-country flight
- ☐ Examiner's fee



U.S. Department
of Transportation

**Federal Aviation
Administration**

**FAA Form 8710-1, Airman Certificate
and/or Rating Application
Supplemental Information and
Instructions**

Paperwork Reduction Act Statement

The information collected on this form is necessary to determine applicant eligibility for airman ratings. We estimate it will take 30 minutes to complete this form. The information collected is required to obtain a benefit and becomes part of the Privacy Act system of records DOT/FAA 847, Aviation Records on Individuals. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a current valid OMB control number. The OMB control number associated with this collection is 2120-0021. You may direct comments concerning the accuracy of this burden and suggestions for reducing the burden to the FAA at: 800 Independence Ave. SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ASP-110.

See attached Privacy Act Information and Pilot's Bill of Rights Written Notification of Investigation

Detach these supplemental information instruction parts before submitting the attached form. Instructions for completing this form (FAA 8710-1 form) are attached. If an electronic form is not printed on a duplex printer, the applicant's name, date of birth, and certificate number (if applicable) must be furnished on the reverse side of the application. This information is required for identification purposes. The applicant's social security number, telephone number, and e-mail address are optional.

Tear off this cover before submitting form

AIRMAN CERTIFICATE AND/OR RATING APPLICATION

PRIVACY ACT STATEMENT: This statement is provided pursuant to 5 U.S.C. § 552(a):

The authority for collecting this information is contained in 49 U.S.C. §§ 40113, 44702, 44703, 44709 and 14 CFR Part 61. The principal purpose for which the information is intended to be used is to identify and evaluate your qualifications and eligibility for the issuance of an airman certificate and/or rating. Submission of the data is mandatory, except for the applicant's social security number which is optional. Failure to provide all required information will result in the FAA being unable to issue you a certificate and/or rating. The information collected on this form will be included in a Privacy Act System of Records known as DOT/FAA 847, titled "Aviation Records on Individuals" and will be subject to the routine uses published in the System of Records Notice for DOT/FAA 847 (see www.dot.gov/privacy/privacyactnotices), including:

- (a) Providing basic airmen certification and qualification information to the public upon request. Examples of basic information include:
- The type of certificate(s) and/or rating(s) held, limitations, date of issuance and certificate number;
 - The status of the airman's certificate (i.e., whether it has been amended, modified, suspended or revoked for any reason);
 - The airman's home address, unless requested by the airman to be withheld from public disclosure per 49 U.S.C. 44703(c);
 - Information relating to an airman's physical status or condition used to determine statistically the validity of FAA medical standards, the date, class, and restrictions of the latest physical;
 - Information relating to an individual's eligibility for medical certification, requests for exemption from medical requirements, and requests for review of medical certificate denials.
- (b) Using contact information to inform airmen of meetings and seminars conducted by the FAA regarding aviation safety.
- (c) Disclosing information to the National Transportation Safety Board in connection with its investigation responsibilities.
- (d) Providing information about airmen to Federal, State, local and tribal law enforcement agencies when engaged in an official investigation in which an airman is involved.
- (e) Providing information about enforcement actions, or orders issued thereunder, to Federal agencies, the aviation industry, and the public upon request.
- (f) Making records of delinquent civil penalties owed to the FAA available to the U.S. Department of the Treasury and the U.S. Department of Justice (DOJ) for collection pursuant to 31 U.S.C. 3711(g).
- (g) Making records of effective orders against the certificates of airmen available to their employers if the airmen use the affected certificates to perform job responsibilities for those employers.
- (h) Making airmen records available to users of FAA's Safety Performance Analysis System (SPAS), including the Department of Defense Commercial Airlift Division's Air Carrier Analysis Support System (ACAS) for its use in identifying safety hazards and risk areas, targeting inspection efforts for certificate holders of greatest risk, and monitoring the effectiveness of targeted oversight actions.
- (i) Making records of an individual's positive drug test result, alcohol test result of 0.04 or greater breath alcohol concentration, or refusal to submit to testing required under a DOT-required testing program, available to third parties, including current and prospective employers of such individuals. Such records also contain the names and titles of individuals who, in their commercial capacity, administer the drug and alcohol testing programs of aviation entities.
- (j) Providing information about airmen through the Civil Aviation Registry's Comprehensive Airmen Information System to the Department of Health and Human Services, Office of Child Support Enforcement, and the Federal Parent Locator Service that locates noncustodial parents who owe child support. Records in this system are used to identify airmen to the child support agencies nationwide in enforcing child support obligations, establishing paternity, establishing and modifying support orders and location of obligors. Records listed within the section on Categories of Records are retrieved using Connect: Direct through the Social Security Administration's secure environment.
- (k) Making personally identifiable information about airmen available to other Federal agencies for the purpose of verifying the accuracy and completeness of medical information provided to FAA in connection with applications for airmen medical certification.
- (l) Making records of past airman medical certification history data available to Aviation Medical Examiners (AMEs) on a routine basis so that AMEs may render the best medical certification decision.
- (m) Making airman, aircraft and operator record elements available to users of FAA's Skywatch system, including the Department of Defense, the Department of Homeland Security (DHS), DOJ and other authorized Federal agencies, for their use in managing, tracking and reporting aviation-related security events.
- (n) Other possible routine uses published in the Federal Register (see Prefatory Statement of General Routine Uses for additional uses (65 FR 19477-78) For example, a record from this system of records may be disclosed to the United States Coast Guard (Coast Guard) and to the Transportation Security Administration (TSA) if information from this system was shared with either agency when that agency was a component of the Department of Transportation (DOT) before its transfer to DHS and such disclosure is necessary to accomplish a DOT, TSA or Coast Guard function related to this system of records.

Your signature on this form (FAA Form 8710-1) acknowledges that you received the Pilot's Bill of Rights Written Notification of Investigation at the time of this application.

PILOT'S BILL OF RIGHTS WRITTEN NOTIFICATION OF INVESTIGATION

The information you submit on the attached FAA Form 8710-1, Airman Certificate and/or Rating Application, will be used by the Administrator of the Federal Aviation Administration as part of the basis for issuing an airman certificate, rating, or inspection authorization to you under Title 49, United States Code (U.S.C.) section 44703(a), if the Administrator finds, after investigation, that you are qualified for, and physically able to perform the duties related to the certificate, rating, or inspection authorization for which you are applying. Therefore, in accordance with the Pilot's Bill of Rights, the Administrator is providing you with this written notification of investigation of your qualifications for an airman certificate, rating, or inspection authorization:

- The nature of the Administrator's investigation, which is precipitated by your submission of this application, is to determine whether you meet the qualifications for the airman certificate, rating, or inspection authorization you are applying for under Title 14, Code of Federal Regulations (CFR) part 61.
- Any response to an inquiry by a representative of the Administrator by you in connection with this investigation of your qualifications for an airman certificate, rating, or inspection authorization may be used as evidence against you.
- A copy of your airman application file for this date is available to you upon your written request addressed to:

Federal Aviation Administration
Airmen Certification Branch,
AFS-760 P.O. Box 25082
Oklahoma City, OK 73125-0082

(If you make a written request for your airman application file, please provide your full name, date of birth or airman certification number for identification purposes, and the date of application.)

**AIRMAN CERTIFICATE AND/OR RATING APPLICATION
INSTRUCTIONS FOR COMPLETING FAA FORM 8710-1**

I. APPLICATION INFORMATION. Mark "X" in all appropriate blocks(s).

Note: Please enter all dates in eight digits as MM/DD/YYYY.
Use numeric characters, (e.g. 01/01/2014).

Block A. Name. Enter full legal name (Last, First, Middle). If your full legal name is more than 50 characters, use no more than one middle name for record purposes. Do not change the name on subsequent applications unless it is done in accordance with 14 CFR part 61.25. If you do not have a middle name, enter "NMN." If you have a middle initial only, indicate "Initial only." Indicate if you are a Jr., II, or III.

Block B. Social Security Number. Enter either your 9-digit social security number, "Do Not Use" or "None" if you are not a U.S. citizen. If entering a social security number, only enter a 9-digit U.S. social security number (optional). See supplemental Privacy Act Information.

Block C. Date of Birth. Enter your date of birth in the following format: MM/DD/YYYY. Check for accuracy. Verify that DOB is the same as it is on the medical certificate.

Block D. Place of Birth. If you were born in the USA, enter the city and state where you were born. If the city is unknown, enter the county and state. If you were born outside the USA, enter the name of the city and country where you were born.

Block E1. Residential Address. Enter your complete residential address. This must include street number, city, state, and zip code. If the applicant has a foreign address, the country must be stated. If a residential address does not exist, a map or written directions to the applicant's physical residence must be attached to the application. Verify that the numbers are not transposed.

Block E2. Mailing Address. Enter your mailing address, if different than block E1. This may be a residence, post office box, rural route, flight school address, personal mail box (PMB), commercial address, or other mail drop location, as applicable. The address provided in block E2, if any, will be printed on the permanent airman certificate. If you want your airman certificate mailed to an address other than provided in blocks E1 or E2, you will need to provide instructions on a separate attachment or in the remarks section of the form.

Block F. Citizenship/Nationality. Mark USA if you are a U.S. Citizen or legally naturalized U.S. Citizen. If you are not a U.S. citizen, mark "Other" and enter the country where you are a legal citizen. To claim Dual Citizenship the applicant must present appropriate documentation of citizenship for each country.

Block G. Do you read, speak, write and understand the English language? Mark yes or no. If you answered "No" and it is due to medical reasons, an operating limitation will be placed on the airman certificate.

Block H. Height. Enter your height in inches. Example: 5'8" would be entered as 68 in. No fractions, use whole inches only.

Block I. Weight. Enter your weight in pounds. No fractions, use whole pounds only.

Block J. Hair Color. Spell out the color of your hair. Choose from the following: bald, black, blond, brown, gray, red or white. If you wear a wig or toupee, enter the color of your hair under the wig or toupee.

Block K. Eye Color. Spell out the color of your eyes. Choose from the following: black, blue, brown, gray, green, or hazel.

Block L. Sex. Mark either Male or Female as appropriate.

Block M. Do You Hold or Have You Ever Held An FAA Pilot Certificate? Mark yes or no. (NOTE: A student pilot certificate is a pilot certificate.) If Yes, complete Blocks M1, M2, and M3.

Block M1. Grade of Certificate. Enter the grade of the FAA pilot certificate you hold (i.e., Student, Recreational, Private, Commercial, or ATP). DO NOT enter flight instructor certificate information.

Block M2. Certificate Number. Enter your current FAA certificate number as it appears on the pilot certificate.

Block M3. Date Issued. Enter the date your pilot certificate was last issued.

Block N. Do You Hold a Medical Certificate? Mark applicable boxes. If yes, complete blocks N1, N2, and N3.

Block N1. Class of Medical Certificate. Enter the class as shown on the medical certificate, (i.e., First, Second, or Third Class).

Block N2. Name of Medical Examiner. Enter the medical examiner's name as shown on your medical certificate.

Block N3. Date Issued. Enter the date your medical certificate was issued.

Block O. Narcotics Drugs. Mark appropriate block. Only mark "Yes" if you have actually been convicted. If you have been charged with a violation which has not been adjudicated, mark "No." Do not include alcohol offenses involving a motor vehicle mode of transportation as those are covered on the FAA Form 8500-8, Medical application.

Block O1. Date of Final Conviction. If block "N" was marked "Yes" provide the date of final conviction.

II. CERTIFICATE OR RATING APPLIED FOR ON BASIS OF:
Block A. Completion of Required Test.

1. Aircraft to be used. (If flight test required) – Enter the make and model of each aircraft used or represented. If a flight simulation training device (FSTD) is used, indicate Level of Device(s).
2. Total time in this aircraft and/or approved full flight simulator (FFS) or flight training device (FTD) (Hrs.) – (2a) Enter the total Flight Time (2b) Enter Pilot-In-Command (PIC) Flight Time.

Block B. U.S. Military Competence Or Experience. Enter your branch of service, date rated as a U.S. military pilot, and your rank or grade. In block 4a and 4b, enter the make and model of each military aircraft used to qualify (as appropriate).

Block C. Graduate of an Approved Course.

1. Name, Location, Certification Number of Training Agency/Center, as shown on the graduation certificate. Indicate if this was a part 142 training center.
2. Curriculum From Which Graduated. Enter name of curriculum and level, category, and/or type rating, as applicable.
3. Date. Date of graduation from indicated course.

Note: Approved course graduate must also complete block A "Completion of Test or Activity," if the course is not part of an Air Agency or a part 142 Training Center.

Block D. Holder of Foreign License.

1. Country that Issued the Foreign Pilot License.
2. Grade Of Foreign Pilot License (i.e. private, commercial, etc).
3. Number. Number which appears on the foreign license.
4. Ratings. Enter the FAA equivalent only ratings that appear on the foreign license. Indicate the ratings as they will appear on the FAA Certificate (i.e. ASEL, AMEL, ROTORCRAFT HELICOPTER, CE-500, etc).

Block E. Completion of Air Carrier's Training Program.

1. Name of air carrier.
2. Date program was started.
3. Identify the training program accomplished.

III. RECORD OF PILOT TIME. At a minimum, the applicant should complete the blocks applicable to the certificate or rating sought; however, it is recommended that all pilot time be entered. If decimal points are utilized, ensure that they are legible. Time entered in the "Class Totals" block should reflect time in aircraft class for the certificate or rating sought with this application. The time entered for an FFS, FTD, and/or ATD may be credited towards the total time in the category, class, and instrument time as permitted by the regulations. Add any Flight Engineer time used for ATP in remarks section.

IV. HAVE YOU PREVIOUSLY RECEIVED A NOTICE OF DISAPPROVAL OR BEEN DENIED FOR ANY REASON FOR THE CERTIFICATE AND/OR RATING FOR WHICH YOU ARE APPLYING? Mark "Yes" or "No" as appropriate.

V. APPLICANT'S CERTIFICATION.

- A. Signature. Sign your name.
- B. Date. The date you signed the application.



Airman Certificate and/or Rating Application

I. APPLICATION INFORMATION (Mark 'X' in all the blocks applicable to the certificate or rating for which you are applying):

Certificates		Ratings				Other Information/Requests			
Pilot: <input type="checkbox"/> Student <input type="checkbox"/> Recreational <input type="checkbox"/> Flight <input type="checkbox"/> Private <input type="checkbox"/> Commercial <input type="checkbox"/> Ground <input type="checkbox"/> ATP-Restricted <input type="checkbox"/> ATP	Instructor: <input type="checkbox"/> ASE <input type="checkbox"/> AME <input type="checkbox"/> Land <input type="checkbox"/> Sea <input type="checkbox"/> Helicopter <input type="checkbox"/> Balloon <input type="checkbox"/> Glider <input type="checkbox"/> Gyroplane <input type="checkbox"/> Airship <input type="checkbox"/> Powered-Lift Type Rating: <input type="checkbox"/> Added Rating	Instrument: <input type="checkbox"/> Airplane <input type="checkbox"/> Basic <input type="checkbox"/> Helicopter <input type="checkbox"/> Advanced <input type="checkbox"/> Powered-Lift <input type="checkbox"/> Instrument	Ground Instructor: <input type="checkbox"/> Initial <input type="checkbox"/> Reexamination <input type="checkbox"/> Instrument Proficiency Check <input type="checkbox"/> Renewal <input type="checkbox"/> Reissuance <input type="checkbox"/> Medical Flight Test <input type="checkbox"/> Reinstatement <input type="checkbox"/> Flight Review <input type="checkbox"/> Limitation Removal Specify other: <input type="checkbox"/> IPL						
A. Name (Last, First, Middle)		B. SSN (U.S. Only)		C. Date of Birth MM/DD/YYYY		D. Place of Birth (City and State) or (City and Country)			
E1. Residential Address (Including City, State, Zip Code, and Country)		E2. Mailing Address (This address will be printed on the permanent airman certificate, if different than block E1.)				F. Citizenship / Nationality <input type="checkbox"/> USA <input type="checkbox"/> Other specify:		G. Do you read, speak, write, & understand the English language? <input type="checkbox"/> Yes <input type="checkbox"/> No	
				H. Height (inches)		I. Weight (pounds)	J. Hair Color	K. Eye Color	L. Sex <input type="checkbox"/> Male <input type="checkbox"/> Female
M. Do you hold, or have you ever held an FAA certificate? <input type="checkbox"/> Yes <input type="checkbox"/> No		M1. Grade of Certificate		M2. Certificate Number			M3. Date Issued		
N. Do you hold a Medical Certificate? <input type="checkbox"/> Yes - FAA <input type="checkbox"/> Yes - Foreign <input type="checkbox"/> Yes-Military <input type="checkbox"/> No		N1. Class of Medical Certificate		N2. Name of Medical Examiner			N3. Date Issued		
O. Have you ever been convicted for violation of any Federal or State statutes relating to narcotic drugs, marijuana, or depressant or stimulant drugs or substances? <i>Do not include alcohol offenses involving motor vehicle mode of transportation as those offenses are covered on the FAA Form 8500-8, Airman Medical Application Form.</i> <input type="checkbox"/> Yes <input type="checkbox"/> No							O1. Date of Final Conviction		

II. CERTIFICATE OR RATING APPLIED FOR ON BASIS OF:

<input type="checkbox"/> A. Completion of Test or Activity	1. Aircraft to be used (If flight test required)	2. Total time in this aircraft and/or approved FFS or FTD (hours)	a. Flight Time	b. As Pilot-in-Command
<input type="checkbox"/> B. Competence or Experience	1. U.S. Military Service	2. Date Rated in U.S. Military	3. Rank or Grade	
	4. List Military aircraft for which you have:	a. logged pilot time or provided flight instruction (IP) (make and model)	b. passed an Instrument Proficiency Check (Pilot or CFI) - (make and model)	
<input type="checkbox"/> C. Graduate of an Approved Course	1. Training Agency or Training Center:	1a. Name	1b. Location (City and State)	1c. Certification Number
	2. Curriculum From Which Graduated (Level, Category, and Class and/or Type Rating)			
	3. Date			
<input type="checkbox"/> D. Holder of Foreign License	1. Country that Issued the Foreign Pilot License	2. Grade of Foreign Pilot License	3. Foreign Pilot License Number	
	4. Ratings Held on Foreign Pilot License (FAA equivalent only - e.g. ASEL, AMEL, Type rating, etc.)			
<input type="checkbox"/> E. Air Carrier Training Program	1. Name of Air Carrier	2. Date Training Began	3. Accomplished Training Program <input type="checkbox"/> Initial <input type="checkbox"/> Upgrade <input type="checkbox"/> Transition <input type="checkbox"/> Recurrent	

III. RECORD OF PILOT TIME (Do not write in the shaded areas)

	Total	Instruction Received	Solo	PIC and SIC	Cross Country Instruction Received	Cross Country Solo	Cross Country PIC/SIC	Instrument	Night Instruction Received	Night Take-Off / Landing	Night PIC/SIC	Night Take-Off/Landing PIC/SIC	Class Totals				Number of			
													SEL EIC SIC	MEL EIC SIC	SES EIC SIC	MES EIC SIC	Flights	Aero-Tows	Ground Launches	Powered Launches
Airplanes				PIC SIC			PIC SIC				PIC SIC	PIC SIC								
Rotorcraft				PIC SIC			PIC SIC				PIC SIC	PIC SIC	Helicopter		Gyroplane					
Powered Lift				PIC SIC			PIC SIC				PIC SIC	PIC SIC								
Gliders				PIC SIC																
Lighter-Than-Air				PIC SIC			PIC SIC				PIC SIC	PIC SIC	Balloon		Airship					
FFS													SF		MF		Helicopter			
FTD																				
ATD																				

IV. Have you previously received a Notice of Disapproval or been denied for any reason for the certificate AND/OR rating for which you are applying? ☐ Yes ☐ No

V. APPLICANT'S CERTIFICATION: I certify that all statements and answers provided by me on this application form are complete and true to the best of my knowledge and I agree that they are to be considered as part of the basis for issuance of any FAA certificate to me. I have received the Pilot's Bill of Rights Written Notification of Investigation that accompanies this form. I have also read and understand the Privacy Act statement that accompanies this form.

Signature of Applicant	Date MM/DD/YYYY
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Stage 1 Exam

Introduction to the Commercial Certificate

Circle the most correct answer choice.

1. When the angle-of-attack of a symmetrical airfoil is increased, the center of pressure will
 - A —move aft (rearward).
 - B —move forward.
 - C —not move.
2. A symmetrical airfoil moving through the air at zero degrees angle-of-attack
 - A —will generate a low static pressure above the wing and a high static pressure beneath the wing.
 - B —will produce a high pressure above the wing and a low pressure beneath the wing.
 - C —will cause similar acceleration of the airflow over both upper and lower surfaces, similar velocities of flow generating similar pressures and therefore no lift.
3. The lift generated by an airfoil is
 - A —proportional to the square of the velocity of the relative airflow.
 - B —inversely proportional to the air density.
 - C —inversely proportional to the wing surface area.
4. If the airplane attitude remains in a new position after the control column is pressed forward and released, the airplane is said to display
 - A —negative longitudinal static stability.
 - B —positive longitudinal static stability.
 - C —neutral longitudinal static stability.
5. If the airplane attitude oscillates about its original position before gradually settling down after the control column is pressed forward and released, the airplane is said to display
 - A —positive dynamic stability.
 - B —neutral static stability.
 - C —negative dynamic stability.

Name: _____

Grade: _____ Date: _____

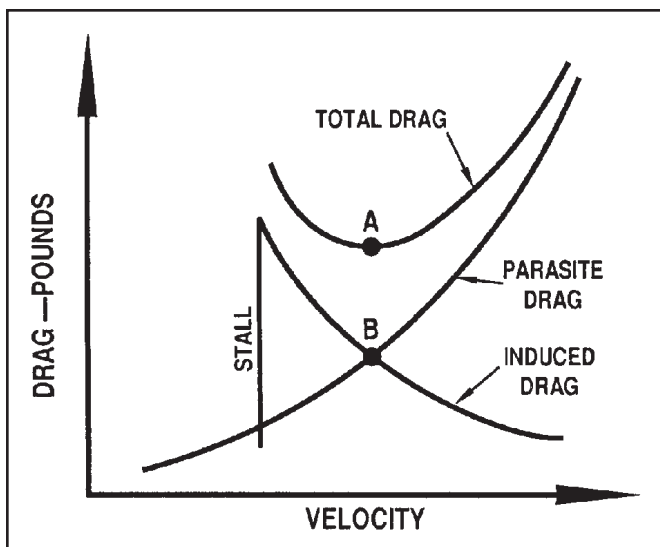
Instructor: _____

6. Longitudinal dynamic instability in an airplane can be identified by
 - A —bank oscillations becoming progressively steeper.
 - B —pitch oscillations becoming progressively steeper.
 - C —the need to apply continuous forward pressure on the control column.
7. If a tire has moved so that the creep marks are out of alignment, then
 - A —the tire is serviceable.
 - B —the tire should be inspected and possibly reinstalled or replaced.
 - C —tire pressure should be checked.
8. Most light airplane braking systems are operated
 - A —by cables.
 - B —pneumatically.
 - C —hydraulically.
9. How many hours are required for completion of the Commercial Certificate, following a §141 program?
 - A —190 hours of flight training, 100 hours of ground training.
 - B —250 hours of flight training, 35 hours of ground training.
 - C —120 hours of flight training, 35 hours of ground training.
10. What is density altitude?
 - A —The altitude above the standard datum plane.
 - B —The pressure altitude corrected for non-standard temperature.
 - C —The altitude read directly from the altimeter.
11. If a pilot changes the altimeter setting from 30.11 to 29.96, what is the approximate change in indication?
 - A —The altimeter will indicate 15 in. Hg higher.
 - B —The altimeter will indicate 150 feet higher.
 - C —The altimeter will indicate 150 feet lower.

- 12.** In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the north if
- A —a right turn is entered from an east heading.
 - B —a left turn is entered from a west heading.
 - C —the aircraft is accelerated while on an east or west heading.

- 13.** Minimum thrust for steady cruise flight occurs at
- A —maximum cruise speed.
 - B —minimum cruise speed.
 - C —the speed for minimum total drag.

- 14.** (Refer to Exam Figure 1, below.) At the airspeed represented by point “B,” in steady flight the pilot can expect to obtain the airplane’s maximum
- A —endurance.
 - B —glide range and cruise range.
 - C —coefficient of lift.



Exam Figure 1. Drag vs. speed

- 15.** While maintaining a constant bank angle and altitude in a coordinated turn, an increase in airspeed will
- A —decrease the rate of turn resulting in a decreased load factor.
 - B —decrease the rate of turn resulting in no change in load factor.
 - C —increase the rate of turn resulting in no change in load factor.

- 16.** During a night flight, you observe a steady white light and a flashing red light ahead and at the same altitude. What is the general direction of movement of the other aircraft?

- A —The other aircraft is crossing to the left.
- B —The other aircraft is crossing to the right.
- C —The other aircraft is flying away from you.

- 17.** To best overcome the effects of spatial disorientation, a pilot should

- A —rely on body sensations.
- B —increase the breathing rate.
- C —rely on aircraft instrument indications.

- 18.** In a nonpressurized airplane, at high altitudes, the amount of oxygen that diffuses across the lung membranes and into the blood is

- A —decreased because of the low partial pressure of oxygen.
- B —decreased because of the lower temperatures.
- C —unchanged to that at sea level.

- 19.** If a pilot does not meet the recency of experience requirements for night flight and official sunset is 1800 CST, the latest time passengers should be carried is

- A —1759 CST.
- B —1829 CST.
- C —1859 CST.

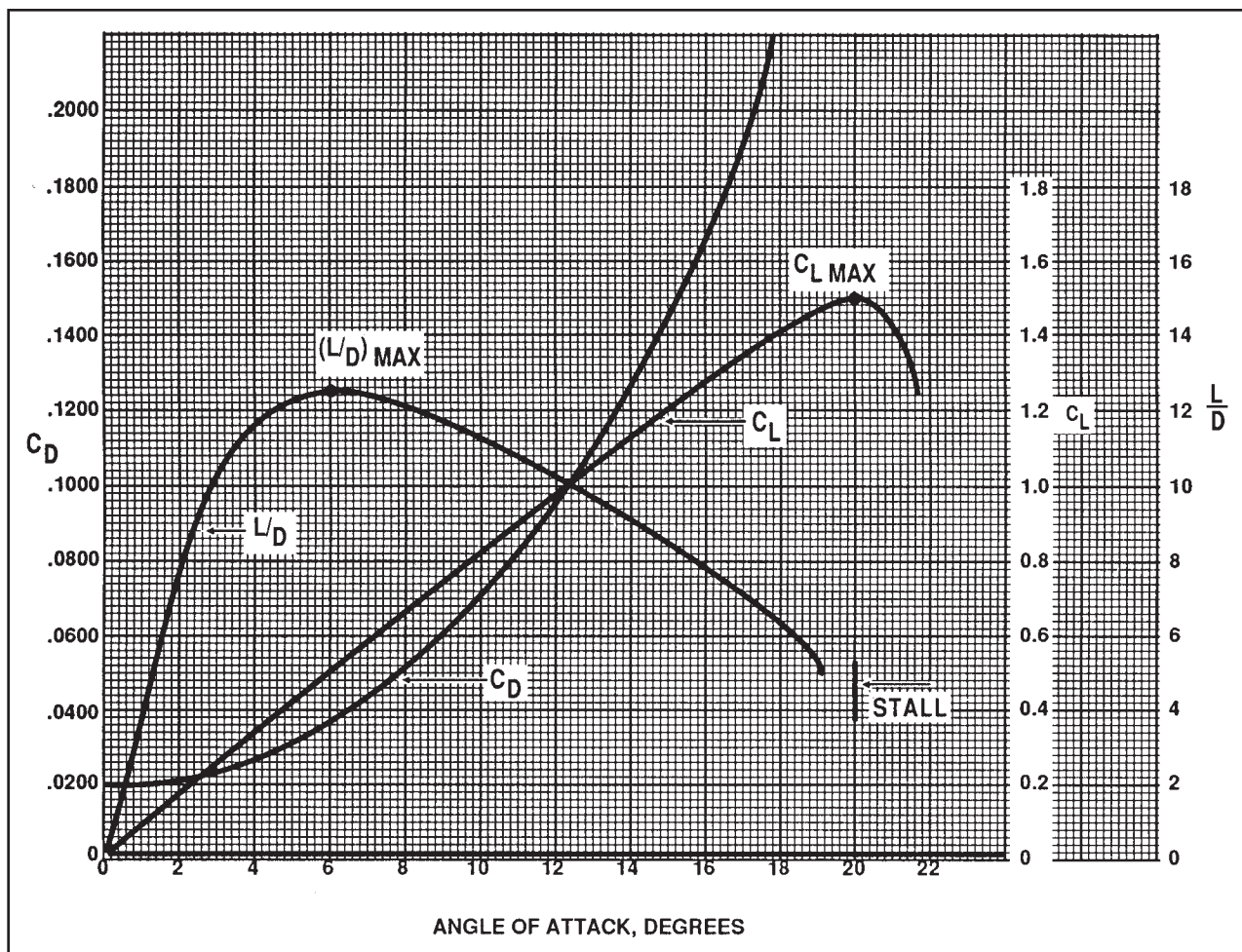
- 20.** For 14 CFR §135 Operations, the airplane flight manual specifies a maximum altitude loss of 75 feet for malfunction of the autopilot under cruise conditions. What is the lowest altitude above the terrain the autopilot may be used during enroute operations?

- A —500 feet.
- B —1,000 feet.
- C —1,500 feet.

- 21.** Which is required equipment for powered aircraft during VFR night flights?

- A —Anticollision light system.
- B —Gyroscopic direction indicator.
- C —Gyroscopic bank-and-pitch indicator.

- 22.** In theory, if the angle of attack and other factors remain constant and the airspeed is doubled, the lift produced at the higher speed will be
- A —the same as the lower speed.
 - B —two times greater than at the lower speed.
 - C —four times greater than at the lower speed.
- 23.** (Refer to Exam Figure 2, Page 1–4) How much altitude will this airplane lose in 3 miles of gliding at an angle of attack of 8° ?
- A —440 feet.
 - B —880 feet.
 - C —1,320 feet.
- 24.** Stall speed is affected by
- A —weight, load factor, and power.
 - B —load factor, angle of attack, and power.
 - C —angle of attack, weight, and air density.
- 25.** If the same angle of attack is maintained in ground effect as when out of ground effect, lift will
- A —increase, and induced drag will decrease.
 - B —decrease, and parasite drag will increase.
 - C —increase, and induced drag will increase.
- 26.** Which procedure should you follow to avoid wake turbulence if a large jet crosses your course from left to right approximately 1 mile ahead and at your altitude?
- A —Make sure you are slightly above the path of the jet.
 - B —Slow your airspeed to V_A and maintain altitude and course.
 - C —Make sure you are slightly below the path of the jet and perpendicular to the course.
- 27.** What is the operational difference between the turn coordinator and the turn-and-slip indicator? The turn coordinator
- A —is always electric; the turn-and-slip indicator is always vacuum-driven.
 - B —indicates bank angle only; the turn-and-slip indicator indicates rate of turn and coordination.
 - C —indicates roll rate, rate of turn, and coordination; the turn-and-slip indicator indicates rate of turn and coordination.
- 28.** A pilot is entering an area where significant clear air turbulence has been reported. Which action is appropriate upon encountering the first ripple?
- A —Maintain altitude and airspeed.
 - B —Adjust airspeed to that recommended for rough air.
 - C —Enter a shallow climb or descent at maneuvering speed.
- 29.** What flight time must be shown, in a reliable record, by a pilot exercising the privileges of a commercial certificate?
- A —Flight time showing aeronautical training and experience to meet requirements for a certificate or rating.
 - B —All flight time flown for compensation or hire.
 - C —Only flight time for compensation or hire with passengers aboard which is necessary to meet the recent flight experience requirements.
- 30.** 14 CFR §135 applies to which operation?
- A —Nonstop sightseeing flights that begin and end at the same airport, and are conducted within a 25 SM radius of that airport.
 - B —Aerial operations for compensation, such as aerial photography, pipeline patrol, rescue, and crop dusting.
 - C —Commercial operations (not an air carrier) in an aircraft with less than 20 passenger seats and a maximum payload capacity of less than 6,000 pounds.



Exam Figure 2

Stage 2 Exam

Cross-Country Flight Experience

Name: _____

Grade: _____ Date: _____

Instructor: _____

Circle the most correct answer choice.

1. What is the minimum radio equipment required for operation within Class C airspace?

A —Two-way radio communication equipment and a 4096 transponder.
B —Two-way radio communications equipment and a 4096-code transponder and a DME.
C —Two-way radio communications equipment and a 4096-code transponder with an encoding altimeter (Mode C).

2. Pilots flying over a national wildlife refuge are requested to fly no lower than

A —1,000 feet AGL.
B —2,000 feet AGL.
C —3,000 feet AGL.

3. If fuel consumption is 80 pounds per hour and groundspeed is 180 knots, how much fuel is required for an airplane to travel 460 NM?

A —205 pounds.
B —212 pounds.
C —460 pounds.

4. An airplane departs an airport under the following conditions:

Airport elevation..... 1,000 ft
Cruise altitude..... 9,500 ft
Rate of climb 500 fpm
Average true airspeed 135 kt
True course 215°
Average wind velocity 290°T/20
Variation 3°W
Deviation -2°
Average fuel consumption..... 13 gal/hr

Determine the approximate time, compass heading, distance, and fuel consumed during the climb.

A —14 minutes, 234°, 26 NM, 3.9 gallons.
B —17 minutes, 224°, 36 NM, 3.7 gallons.
C —17 minutes, 242°, 31 NM, 3.5 gallons.

5. (Refer to Exam Figure 3, Page 2–4.) Given:

Empty weight (oil is included) 1,271 lb
Empty weight moment (in-lb/1,000) 102.04
Pilot and copilot..... 360 lb
Cargo 340 lb
Fuel 37 gal

Will the CG remain within limits after 30 gallons of fuel have been used in flight?

A —Yes, the CG will remain within limits.
B —No, the CG will be located aft of the CG limit.
C —Yes, but the CG will be located in the shaded area of the CG envelope.

6. (Refer to Exam Figure 4, Page 2–5.) Which illustration indicates that the airplane should be turned 150° left to intercept the 360 radial at a 60° angle inbound?

A —A.
B —B.
C —C.

7. (Refer to Exam Figure 5, Page 2–6.) If an aircraft has the indications shown in instrument group 3, then makes a 180° turn to the left and continues straight ahead, it will intercept which radial?

A —135 radial.
B —270 radial.
C —360 radial.

8. Calculate distance to the station given:

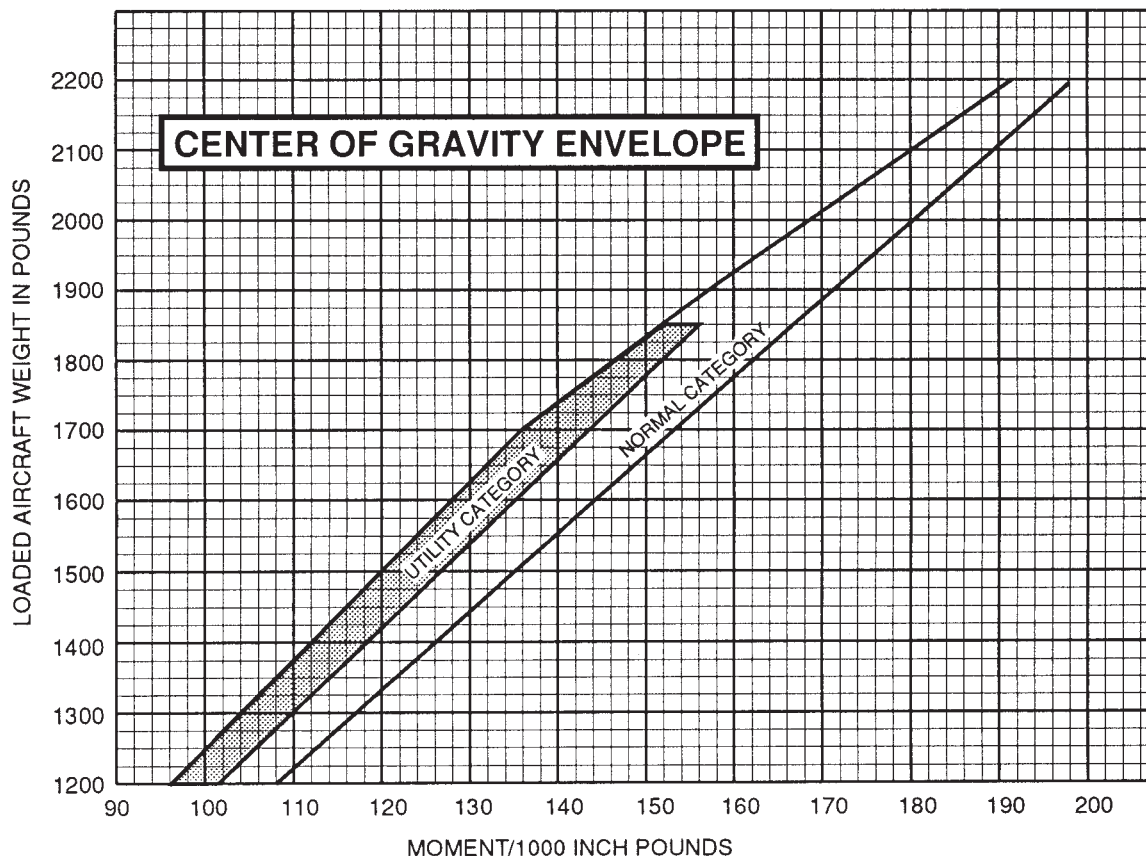
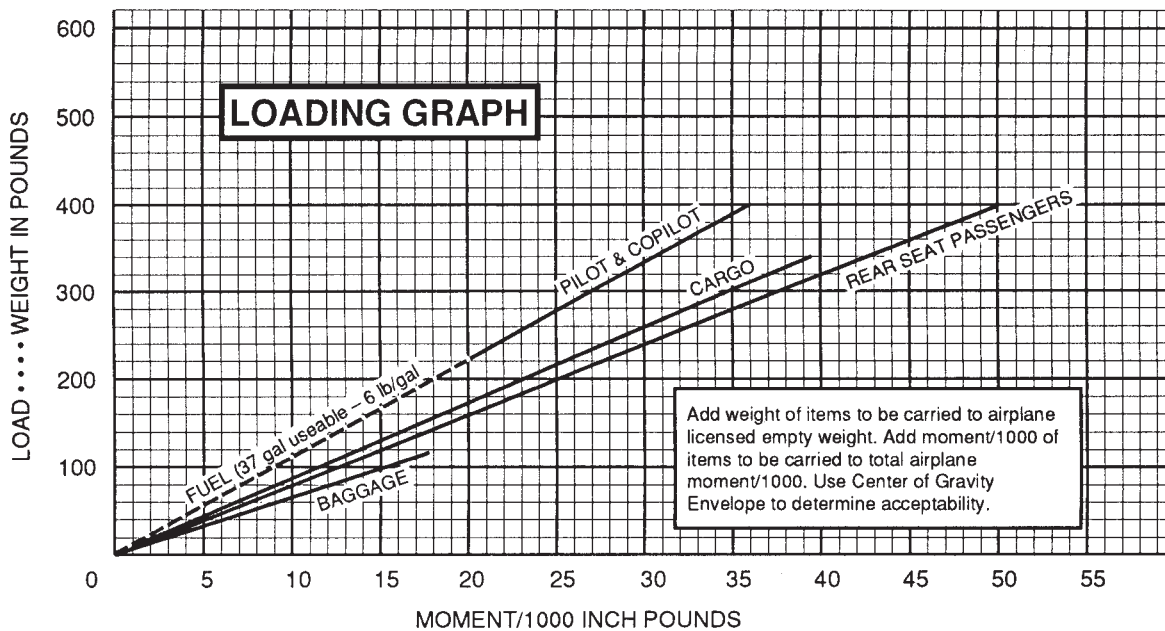
Wing tip bearing change..... 5°
Time elapsed between bearing change 5 min
True airspeed 115 knots
A —230 NM (45 min).
B —115 NM (60 min).
C —85 NM (45 min).

9. While cruising at 135 knots and on a constant heading, the ADF needle decreases from a relative bearing of 315° to 270° in 7 minutes. The approximate time and distance to the station being used is

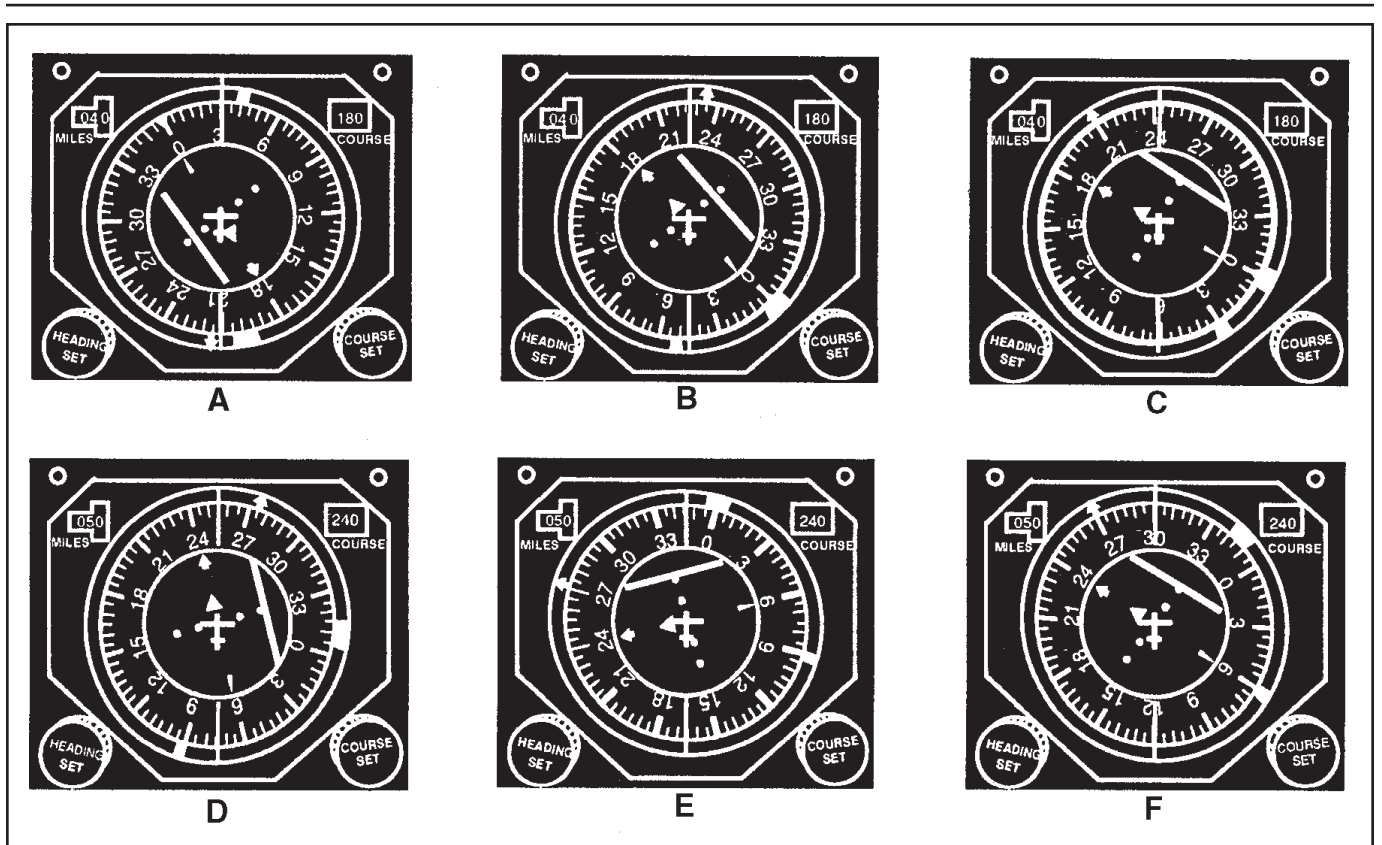
A —7 minutes and 16 miles.
B —14 minutes and 28 miles.
C —19 minutes and 38 miles.

- 10.** (Refer to Exam Figure 6, Page 2–7.) Determine the magnetic bearing TO the station as indicated by the ADF dial.
- A —330°.
 - B —180°.
 - C —210°.
- 11.** What is a suitable cruise altitude at or above your safety altitude of 4,300 feet MSL if the cloud bases are at 7,000 feet MSL and your planned magnetic course is 250°?
- A —5,500 feet MSL.
 - B —4,500 feet MSL.
 - C —6,500 feet MSL.
- 12.** You are 2 NM left of course after traveling 15 NM. What is the tracking error?
- A —8° left.
 - B —8° right.
 - C —12° left.
- 13.** What is indicated if ice pellets are encountered at 8,000 feet?
- A —Freezing rain at higher altitude.
 - B —You are approaching an area of thunderstorms.
 - C —You will encounter hail if you continue your flight.
- 14.** Which conditions are favorable for the formation of a surface-based temperature inversion?
- A —Clear, cool nights with calm or light wind.
 - B —Area of unstable air rapidly transferring heat from the surface.
 - C —Broad areas of cumulus clouds with smooth, level bases at the same altitude.
- 15.** In what ways do advection fog, radiation fog, and steam fog differ in their formation or location?
- A —Radiation fog is restricted to land areas; advection fog is most common along coastal areas; steam fog forms over a water surface.
 - B —Advection fog deepens as wind speed increases up to 20 knots; steam fog requires calm or very light wind; radiation fog forms when the ground or water cools the air by radiation.
 - C —Steam fog forms from moist air moving over a colder surface; advection fog requires cold air over a warmer surface; radiation fog is produced by radiation cooling of the ground.
- 16.** Which in-flight hazard is most commonly associated with warm fronts?
- A —Advection fog.
 - B —Radiation fog.
 - C —Precipitation-induced fog.
- 17.** Given:
- Wind 175° at 20 kts
 - Distance 135 NM
 - True course 075°
 - True airspeed 80 kts
 - Fuel consumption 105 lb/hr
- Determine the time en route and fuel consumption.
- A —1 hour 28 minutes and 73.2 pounds.
 - B —1 hour 38 minutes and 158 pounds.
 - C —1 hour 40 minutes and 175 pounds.
- 18.** Given:
- Pressure altitude 12,000 ft
 - True air temperature +50°F
- From the conditions given, the approximate density altitude is
- A —11,900 feet.
 - B —14,130 feet.
 - C —18,150 feet.
- 19.** Given:
- True course 345°
 - True heading 355°
 - True airspeed 85 kts
 - Groundspeed 95 kts
- Determine the wind direction and speed.
- A —095° and 19 knots.
 - B —113° and 19 knots.
 - C —238° and 18 knots.
- 20.** Given:
- Distance off course 9 mi
 - Distance flown 95 mi
 - Distance to fly 125 mi
- To converge at the destination, the total correction angle would be
- A —4°.
 - B —6°.
 - C —10°.

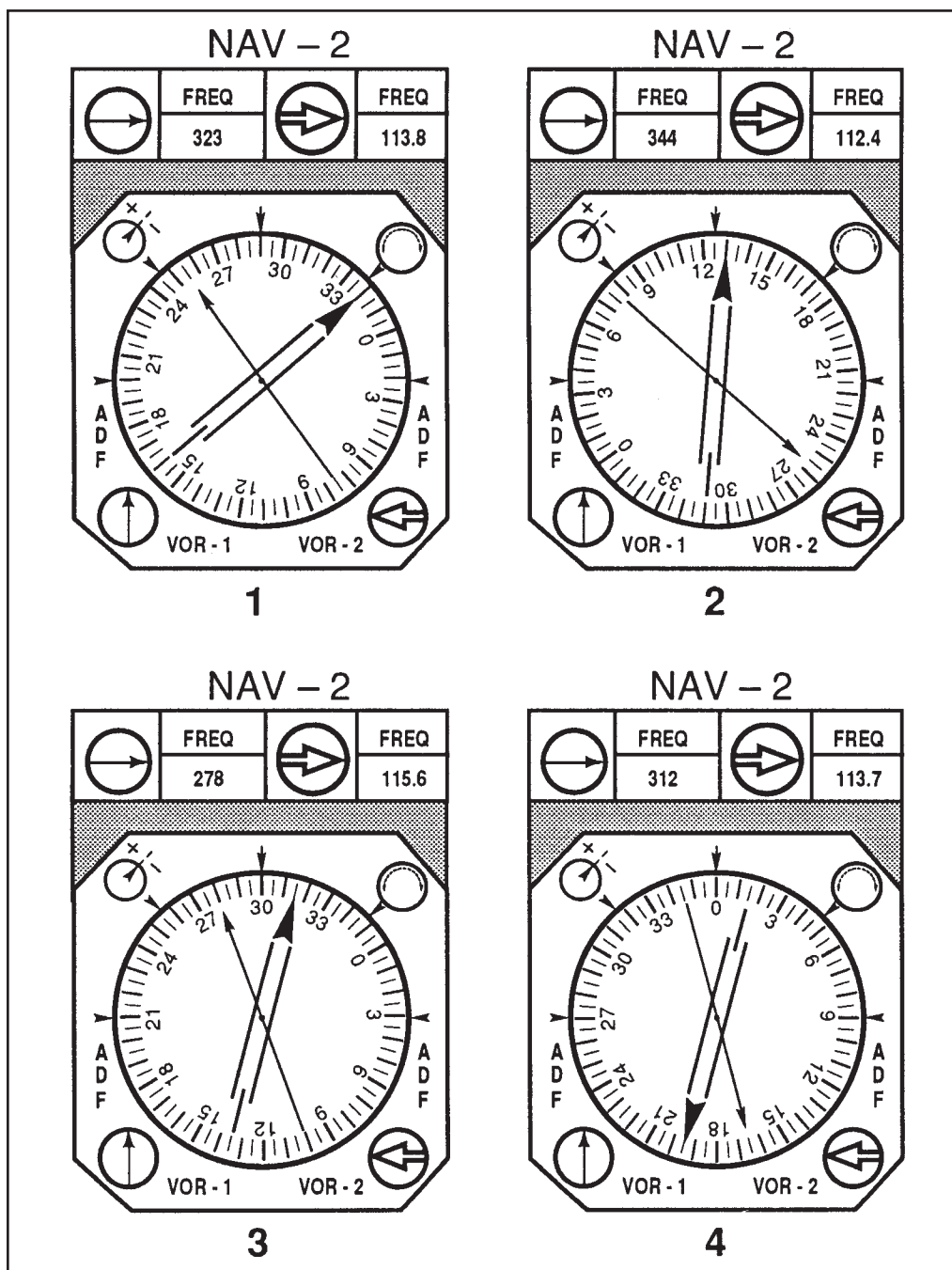
- 21.** To track inbound on the 215 radial of a VOR station, the recommended procedure is to set the OBS to
- A —215° and make heading corrections toward the CDI needle.
 - B —215° and make heading corrections away from the CDI needle.
 - C —035° and make heading corrections toward the CDI needle.
- 22.** Inbound on the 040 radial, a pilot selects the 055 radial, turns 15° to the left, and notes the time. While maintaining a constant heading, the pilot notes the time for the CDI to center is 15 minutes. Based on this information, the ETE to the station is
- A —8 minutes.
 - B —15 minutes.
 - C —30 minutes.
- 23.** An aircraft is maintaining a magnetic heading of 265° and the ADF shows a relative bearing of 065°. This indicates that the aircraft is crossing the
- A —065° magnetic bearing FROM the radio beacon.
 - B —150° magnetic bearing FROM the radio beacon.
 - C —330° magnetic bearing FROM the radio beacon.
- 24.** The relative bearing on an ADF changes from 265° to 260° in 2 minutes elapsed time. If the ground-speed is 145 knots, the distance to that station would be
- A —26 NM.
 - B —37 NM.
 - C —58 NM.
- 25.** While maintaining a constant heading, a relative bearing of 10° doubles in 5 minutes. If the true airspeed is 105 knots, the time and distance to the station being used is approximately
- A —5 minutes and 8.7 miles.
 - B —10 minutes and 17 miles.
 - C —15 minutes and 31.2 miles.
- 26.** What designated airspace associated with an airport become inactive when the control tower at that airport is not in operation?
- A —Class D, which then becomes Class C.
 - B —Class D, which then become Class E.
 - C —Class B.
- 27.** Which is true relating to the blue and magenta colors used to depict airports on Sectional Aeronautical Charts?
- A —Class E airports are shown in blue; Class C and D are magenta.
 - B —Class B airports are shown in blue; Class D and E are magenta.
 - C —Class E airports are shown in magenta; Class B, C, and D are blue.
- 28.** What is the minimum flight visibility and proximity to cloud requirements for VFR flight, at 6,500 feet MSL, in Class C, D, and E airspace?
- A —1 mile visibility; clear of clouds.
 - B —3 miles visibility; 1,000 feet above and 500 feet below.
 - C —5 miles visibility; 1,000 feet above and 1,000 feet below.
- 29.** To operate an airplane under Special VFR (SVFR) within Class D airspace at night, which is required?
- A —The pilot must hold an instrument pilot rating, but the airplane need not be equipped for instrument flight, as long as the weather will remain at or above SVFR minimums.
 - B —The Class D airspace must be specifically designated as a night SVFR area.
 - C —The pilot must hold an instrument pilot rating and the airplane must be equipped for instrument flight.



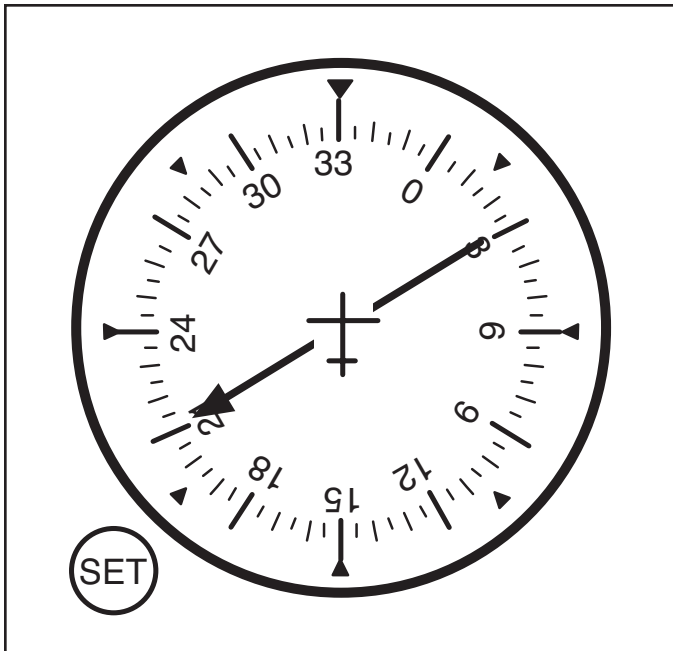
Exam Figure 3. Loading graph and center-of-gravity envelope



Exam Figure 4



Exam Figure 5. Radio Magnetic Indicator (RMI)



Exam Figure 6

Stage 3 Exam

Complex Aircraft and Night Flying Experience

Name: _____

Grade: _____ Date: _____

Instructor: _____

Circle the most correct answer choice.

1. The spark plugs in a piston engine are provided with a high energy (or high tension) electrical supply from
A —the battery at all times.
B —the magnetos.
C —the battery at start-up, and then the magnetos.
2. While cruising at 9,500 feet MSL, the fuel/air mixture is properly adjusted. What will occur if a descent to 4,500 feet MSL is made without readjusting the mixture?
A —The fuel/air mixture may become excessively lean.
B —There will be more fuel in the cylinders than is needed for normal combustion, and the excess fuel will absorb heat and cool the engine.
C —The excessively rich mixture will create higher cylinder head temperatures and may cause detonation.
3. Which condition is most favorable to the development of carburetor icing?
A —Any temperature below freezing and a relative humidity of less than 50 percent.
B —Between 32°F and 50°F and low humidity.
C —Between 20°F and 70°F and high humidity.
4. In an airplane with a constant-speed propeller, which of the following procedures should be used?
A —When power is decreased, reduce rpm before manifold pressure.
B —When power is increased, increase rpm before manifold pressure.
C —When power is increased or decreased, adjust manifold pressure before rpm.
5. When operating a constant-speed propeller
A —avoid high rpm setting with high manifold pressures.
B —avoid low rpm setting with high manifold pressures.
C —always use a rich mixture with high rpm settings.
6. If the oil temperature gauge and the cylinder head temperature gauge are both reading higher than the normal operating range, a possible cause is
A —an over-rich mixture and too much power.
B —a too-lean mixture and too much power.
C —fuel with a higher-than-specified fuel rating.
7. What type of fuel can be substituted in an aircraft if the recommended octane is not available?
A —The next higher octane aviation gas.
B —The next lower octane aviation gas.
C —Unleaded automotive gas of the same octane rating.
8. If you allow a fuel tank to run dry in flight before changing tanks, you run the risk of
A —air being drawn into the fuel lines and causing a vapor lock.
B —overheating the fuel pump, leading to failure.
C —pumping foreign matter into the fuel lines.
9. The battery master switch should be turned to OFF after the engine is stopped to avoid the battery discharging through
A —the magnetos.
B —the alternator or generator.
C —the electrical services connected to it.
10. If the operational category of an airplane is listed as “utility” it would mean that this airplane could be operated in which of the following maneuvers?
A —All types of acrobatics.
B —Limited acrobatics, including spins (if approved).
C —Any maneuver except acrobatics or spins.
11. Which V-speed represents maximum landing gear extended speed?
A — V_{LE}
B — V_{LO}
C — V_{FE}

- 12.** Which combination of atmospheric conditions will reduce airplane takeoff and climb performance?
- A —Low temperature, low relative humidity, and low density altitude.
 - B —High temperature, low relative humidity, and low density altitude.
 - C —High temperature, high relative humidity, and high density altitude.
- 13.** Which procedure should you follow to avoid wake turbulence if a large jet crosses your course from left to right approximately 1 mile ahead and at your altitude?
- A —Make sure you are slightly above the path of the jet.
 - B —Slow your airspeed to V_A and maintain altitude and course.
 - C —Make sure you are slightly below the path of the jet and perpendicular to the course.
- 14.** What is ground effect?
- A —The result of the interference of the surface of the earth with the airflow patterns about an airplane.
 - B —The result of an alteration in airflow patterns increasing induced drag about the wings of an airplane.
 - C —The result of the disruption of the airflow patterns about the wings of an airplane to the point where the wings will no longer support the airplane in flight.
- 15.** (Refer to Exam Figure 8, Page 3–4.) Given:
- Temperature 30°F
 Pressure altitude 6,000 feet
 Weight..... 3,300 pounds
 Headwind..... 20 knots
- What is the total takeoff distance over a 50-foot obstacle?
- A —1,100 feet.
 - B —1,300 feet.
 - C —1,500 feet.
- 16.** Which maximum range factor decreases as weight decreases?
- A —Maximum range altitude.
 - B —Maximum range airspeed.
 - C —Maximum range angle-of-attack.
- 17.** (Refer to Exam Figure 9, Page 3–5.) What flight time is available, allowing for VFR day fuel reserve, under the following conditions if the mixture is leaned correctly?
- Pressure altitude 18,000 ft
 Temperature -21°C
 Power 2,400 rpm, 28" MP
 Usable fuel..... 425 lb
- A —5 hours 28 minutes.
 - B —4 hours 01 minutes.
 - C —3 hours 14 minutes.
- 18.** A military air station can be identified by a rotating beacon that emits
- A —white and green alternating flashes.
 - B —two, quick, white flashes between green flashes.
 - C —green, yellow, and white flashes.
- 19.** A flashing white light signal from the control tower to a taxiing aircraft is an indication to
- A —taxi at a faster speed.
 - B —taxi only on taxiways and not cross runways.
 - C —return to the starting point on the airport.
- 20.** After landing at a tower-controlled airport, when should the pilot contact ground control?
- A —When advised to do so by the tower.
 - B —Prior to turning off the runway.
 - C —After reaching a taxiway that leads directly to the parking area.
- 21.** Leaving the carburetor heat on while taking off
- A —leans the mixture for more power on takeoff.
 - B —will decrease the takeoff distance.
 - C —will increase the ground roll.
- 22.** For internal cooling, reciprocating aircraft engines are especially dependent on
- A —a properly functioning cowl flap augments.
 - B —the circulation of lubricating oil.
 - C —the proper freon/compressor output ratio.
- 23.** To develop maximum power and thrust, a constant-speed propeller should be set to a blade angle that will produce a
- A —large angle of attack and low RPM.
 - B —small angle of attack and high RPM.
 - C —large angle of attack and high RPM.

- 24.** During preflight in cold weather, crankcase breather lines should receive special attention because they are susceptible to being clogged by
- A —congealed oil from the crankcase.
 - B —moisture from the outside air which has frozen.
 - C —ice from crankcase vapors that have condensed and subsequently frozen.
- 25.** Propeller efficiency is the
- A —ratio of thrust horsepower to brake horsepower.
 - B —actual distance a propeller advances in one revolution.
 - C —ratio of geometric pitch to effective pitch.
- 26.** Baggage weighing 90 pounds is placed in a normal category airplane's baggage compartment which is placarded at 100 pounds. If this airplane is subjected to a positive load factor of 3.5 Gs, the total load of the baggage would be
- A —315 pounds and would be excessive.
 - B —315 pounds and would not be excessive.
 - C —350 pounds and would not be excessive.
- 27.** Given:
- Total weight 4,137 lb
 CG location Station 67.8
 Fuel consumption 13.7 GPH
 Fuel CG Station 68.0
- After 1 hour 30 minutes of flight time, the CG would be located at station
- A —67.79.
 - B —68.79.
 - C —70.78.
- 28.** (Refer to Exam Figure 10, Page 3–6.) Rwy 30 is being used for landing. Which surface wind would exceed the airplane's crosswind capability of 0.2 V_{SO} , if V_{SO} is 60 knots?
- A —260° at 20 knots.
 - B —275° at 25 knots.
 - C —315° at 35 knots.
- 29.** Which type of approach and landing is recommended during gusty wind conditions?
- A —A power-on approach and power-on landing.
 - B —A power-off approach and power-on landing.
 - C —A power-on approach and power-off landing.
- 30.** (Refer to Exam Figure 11, Page 3–7.) Using a maximum rate of climb, how much fuel would be used from engine start to 6,000 feet pressure altitude?
- | | |
|---------------------------------|----------|
| Aircraft weight | 3,200 lb |
| Airport pressure altitude | 2,000 ft |
| Temperature | 27°C |
- A —10 pounds.
 - B —14 pounds.
 - C —24 pounds.

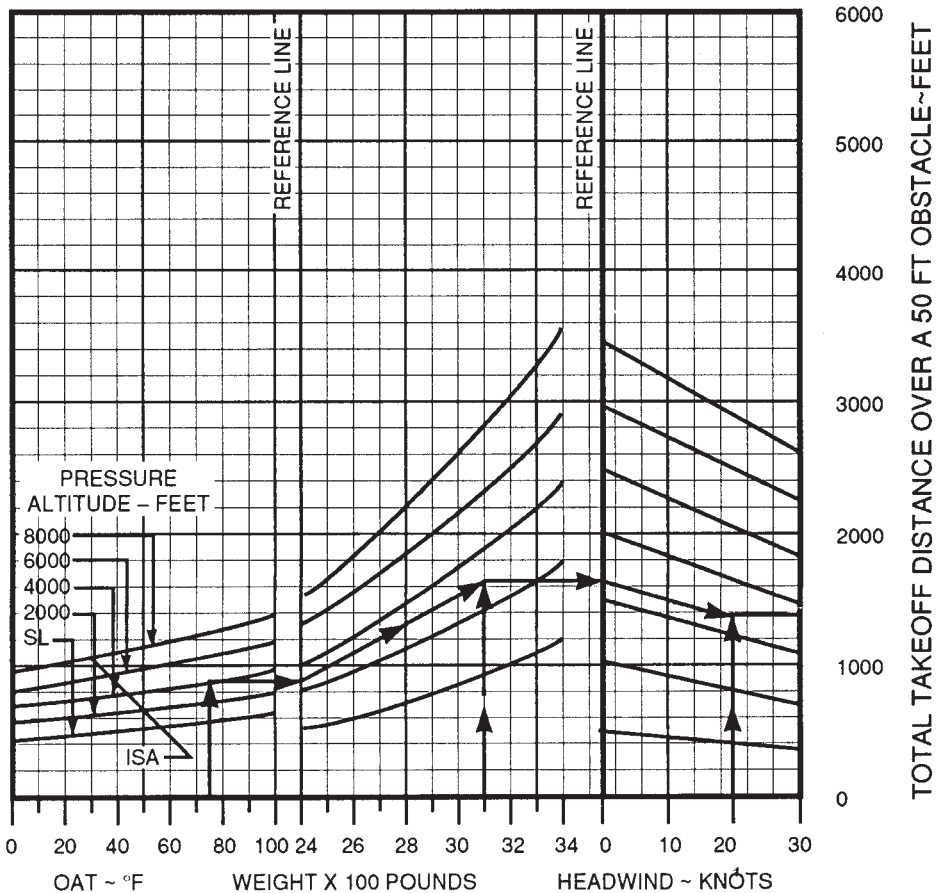
ASSOCIATED CONDITIONS:

POWER TAKEOFF POWER
SET BEFORE
BRAKE RELEASE
FLAPS 20*
RUNWAY PAVED, LEVEL,
DRY SURFACE
TAKEOFF SPEED IAS AS TABULATED
NOTE: GROUND ROLL IS APPROX. 73%
OF TOTAL TAKEOFF DISTANCE
OVER A 50 FT OBSTACLE

EXAMPLE:

OAT 75 °F
PRESSURE ALTITUDE 4000 FT
TAKEOFF WEIGHT 3100 LB
HEADWIND 20 KNOTS
TOTAL TAKEOFF DISTANCE
OVER A 50 FT OBSTACLE 1350 FT
GROUND ROLL (73% OF 1350) 986 FT
IAS TAKEOFF SPEED
LIFT-OFF 74 MPH
AT 50 FT 74 MPH

WEIGHT POUNDS	IAS TAKEOFF SPEED (ASSUMES ZERO INSTR. ERROR)			
	LIFT-OFF		50 FEET	
	MPH	KNOTS	MPH	KNOTS
3400	77	67	77	67
3200	75	65	75	65
3000	72	63	72	63
2800	69	60	69	60
2600	66	57	66	57
2400	63	55	63	55



Exam Figure 8. Obstacle takeoff chart

PRESSURE ALTITUDE 18,000 FEET

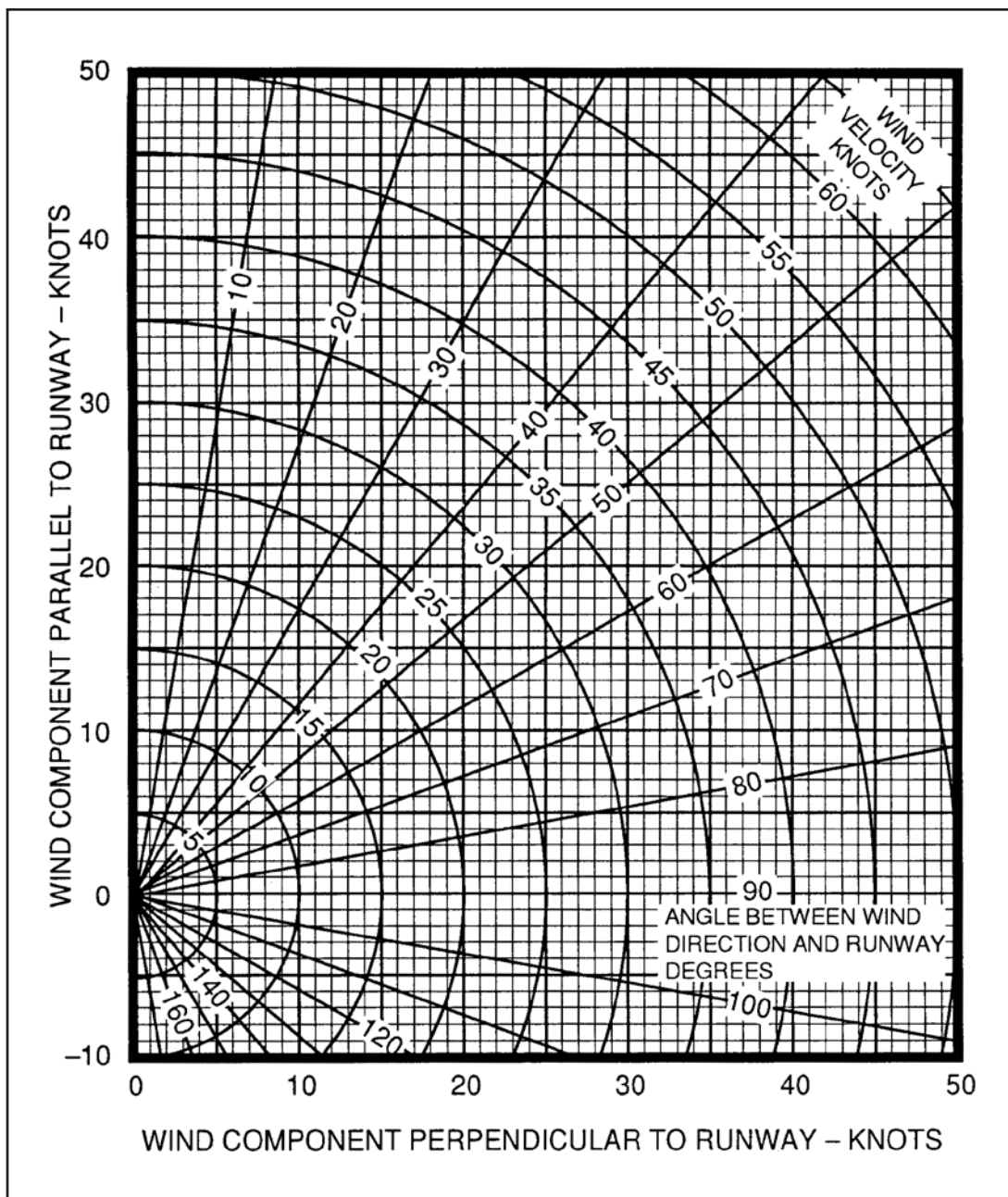
CONDITIONS:
4000 Pounds
Recommended Lean Mixture
Cowl Flaps Closed

NOTE

For best fuel economy at 70% power or less, operate at 6 PPH leaner than shown in this chart or at peak EGT.

RPM	MP	20 °C BELOW STANDARD TEMP -41 °C			STANDARD TEMPERATURE -21 °C			20 °C ABOVE STANDARD TEMP -1 °C		
		% BHP	KTAS	PPH	% BHP	KTAS	PPH	% BHP	KTAS	PPH
2500	30	---	---	---	81	188	106	76	185	100
	28	80	184	105	76	182	99	71	178	93
	26	75	178	99	71	176	93	67	172	88
	24	70	171	91	66	168	86	62	164	81
	22	63	162	84	60	159	79	56	155	75
2400	30	81	185	107	77	183	101	72	180	94
	28	76	179	100	72	177	94	67	173	88
	26	71	172	93	67	170	88	63	166	83
	24	66	165	87	62	163	82	58	159	77
	22	61	158	80	57	155	76	54	150	72
2300	30	79	182	103	74	180	97	70	176	91
	28	74	176	97	70	174	91	65	170	86
	26	69	170	91	65	167	86	61	163	81
	24	64	162	84	60	159	79	56	155	75
	22	58	154	77	55	150	73	51	145	65
2200	26	66	166	87	62	163	82	58	159	77
	24	61	158	80	57	154	76	54	150	72
	22	55	148	73	51	144	69	48	138	66
	20	49	136	66	46	131	63	43	124	59

Exam Figure 9. Cruise performance



Exam Figure 10. Wind component chart

MAXIMUM RATE OF CLIMB

CONDITIONS:

Flaps Up
Gear Up
2700 RPM
Full Throttle
Mixture Set at Placard Fuel Flow
Cowl Flaps Open
Standard Temperature

MIXTURE SETTING	
PRESS ALT	PPH
S.L.	138
4000	126
8000	114
12,000	102

NOTES:

1. Add 12 pounds of fuel for engine start, taxi and takeoff allowance.
2. Increase time, fuel and distance by 10% for each 10 °C above standard temperature.
3. Distances shown are based on zero wind.

WEIGHT LBS	PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
				TIME MIN	FUEL USED POUNDS	DISTANCE NM
3800	S.L.	97	860	0	0	0
	2000	95	760	2	6	4
	4000	94	660	5	12	9
	6000	93	565	9	18	14
	8000	91	465	13	26	21
	10,000	90	365	18	35	29
	12,000	89	265	24	47	41
3500	S.L.	95	990	0	0	0
	2000	94	885	2	5	3
	4000	93	780	5	10	7
	6000	91	675	7	16	12
	8000	90	570	11	22	17
	10,000	89	465	15	29	24
	12,000	87	360	20	38	32
3200	S.L.	94	1135	0	0	0
	2000	92	1020	2	4	3
	4000	91	910	4	9	6
	6000	90	800	6	14	10
	8000	88	685	9	19	14
	10,000	87	575	12	25	20
	12,000	86	465	16	32	26

Exam Figure 11. Fuel, time, and distance to climb

Stage 4 Exam

Prep for Checkride

Final Exam

Name: _____

Grade: _____ Date: _____

Instructor: _____

Circle the most correct answer choice.

1. Most of the water vapor in the atmosphere is contained in the
A —tropopause.
B —troposphere.
C —stratosphere.
2. Every physical process of weather is accompanied by or is the result of
A —a heat exchange.
B —the movement of air.
C —a pressure differential.
3. Convective circulation patterns associated with sea breezes are caused by
A —warm, dense air moving inland from over the water.
B —water absorbing and radiating heat faster than the land.
C —cool, dense air moving inland from over the water.
4. What causes air to flow counterclockwise around a low-pressure area in the Northern Hemisphere?
A —Coriolis force.
B —Surface friction.
C —Pressure gradient.
5. During the summer months in the middle latitudes, the jetstream shifts toward the
A —north and speed decreases.
B —south and speed increases.
C —north and speed increases.
6. A strong windshear can be expected
A —in the jetstream from above a core having a speed of 60 to 90 knots.
B —if the 5°C isotherms are spaced between 7° and 10° of latitude.
C —on the low-pressure side of a jetstream core where the speed at the core is stronger than 110 knots.
7. When an air mass is stable, which of these conditions are most likely to exist?
A —Towering cumulus and cumulonimbus clouds.
B —Moderate to severe turbulence at the lower levels.
C —Smoke and/or dust are concentrated at the lower levels with resulting poor visibility.
8. What minimum distance should exist between intense radar echoes before any attempt is made to fly between these thunderstorms?
A —20 miles.
B —30 miles.
C —40 miles.
9. Which combination of weather-producing variables would likely result in cumuliform-type clouds, good visibility, and shower rain?
A —Stable, moist air and orographic lifting.
B —Unstable, moist air and orographic lifting.
C —Unstable, moist air and no lifting mechanism.
10. Which is true with respect to a high or low-pressure system?
A —A high-pressure area or ridge is an area of rising air.
B —A low-pressure area or trough is an area of descending air.
C —A high-pressure area or ridge is an area of descending air.
11. When flying into a low-pressure area in the Northern Hemisphere, the wind direction and velocity will be from the
A —left and decreasing.
B —left and increasing.
C —right and decreasing.
12. Which is true regarding a cold front occlusion?
A —The air ahead of the warm front is colder than the air behind the overtaking cold front.
B —The air ahead of the warm front is warmer than the air behind the overtaking cold front.
C —The air ahead of the warm front has the same temperature as the air behind the overtaking cold front.

- 13.** What is the upper limit of the Low Level Significant Weather Prognostic Chart?
- A —30,000 feet.
 - B —24,000 feet.
 - C —18,000 feet.
- 14.** Hatching on a Constant Pressure Analysis Chart indicates
- A —a hurricane eye.
 - B —wind speed 70 knots to 100 knots.
 - C —wind speed 110 knots to 150 knots.
- 15.** Terminal aerodrome forecasts are issued
- A —4 times daily and are valid for 24 hours.
 - B —6 times daily and are valid for 8 hours.
 - C —hourly and are valid for 1 hour.
- 16.** What prevents air from flowing directly from high-pressure areas to low-pressure areas?
- A —Coriolis force.
 - B —Surface friction.
 - C —Pressure gradient force.
- 17.** What is the approximate base of the cumulus clouds if the temperature at 2,000 feet MSL is 70°F and the dewpoint is 52°F?
- A —3,000 feet MSL.
 - B —4,000 feet MSL.
 - C —6,000 feet MSL.
- 18.** Virga is best described as
- A —streamers of precipitation trailing beneath clouds which evaporates before reaching the ground.
 - B —wall cloud torrents trailing beneath cumulonimbus clouds which dissipate before reaching the ground.
 - C —turbulent areas beneath cumulonimbus clouds.
- 19.** Given:
- Winds at 3,000 feet AGL 30 kts
 Surface winds Calm
- While approaching for landing under clear skies a few hours after sunrise, one should
- A —allow a margin of approach airspeed above normal to avoid stalling.
 - B —keep the approach airspeed at or slightly below normal to compensate for floating.
 - C —not alter the approach airspeed, these conditions are nearly ideal.
- 20.** The station originating the following METAR observation has a field elevation of 3,500 feet MSL. If the sky cover is one continuous layer, what is the thickness of the cloud layer? (Top of overcast reported at 7,500 feet MSL.)
- METAR KHOB 151250Z 17006KT 4SM OVC005 13/11 A2998
- A —2,500 feet.
 - B —3,500 feet.
 - C —4,000 feet.
- 21.** Which statement pertaining to the following Terminal Aerodrome Forecast (TAF) is true?
- TAF
 KMEM 091135Z 0915 15005KT 5SM HZ
 BKN060 FM 1600 VRB04KT P6SM SKC
- A —Wind in the valid period implies surface winds are forecast to be greater than 5 KTS.
 - B —Wind direction is from 160° at 4 KTS and reported visibility is 6 statute miles.
 - C —SKC in the valid period indicates no significant weather and sky clear.
- 22.** What values are used for Winds Aloft Forecasts?
- A —True direction and MPH.
 - B —True direction and knots.
 - C —Magnetic direction and knots.
- 23.** From which of the following can the observed temperature, wind, and temperature/dew point spread be determined at a specified altitude?
- A —Stability Charts.
 - B —Winds Aloft Forecasts.
 - C —Constant Pressure Analysis Charts.
- 24.** FSS's in the conterminous 48 United States having voice capability on VORs or radiobeacons (NDBs) broadcast
- A —AIRMETs and SIGMETs at 15 minutes past the hour and each 15 minutes thereafter as long as they are in effect.
 - B —AIRMETs and nonconvective SIGMETs at 15 minutes and 45 minutes past the hour for the first hour after issuance.
 - C —hourly weather reports at 15 and 45 minutes past each hour for those reporting stations within approximately 150 NM of the broadcast stations.

- 25.** When making an instrument approach at the selected alternate airport, what landing minimums apply?
- A —Standard alternate minimums.
 - B —The IFR alternate minimums listed for that airport.
 - C —The landing minimums published for the type of procedure selected.
- 26.** Which is true regarding the use of a Standard Instrument Departure (DP) chart?
- A —At airfields where DPs have been established, DP usage is mandatory for IFR departures.
 - B —To use a DP, the pilot must possess at least the textual description of the approved standard departure.
 - C —To use a DP, the pilot must possess both the textual and graphic form of the approved standard departure.
- 27.** Most pilots have fallen prey to dangerous tendencies or behavior problems at some time. Some of these dangerous tendencies or behavior patterns which must be identified and eliminated include:
- A —Deficiencies in instrument skills and knowledge of aircraft systems or limitations.
 - B —Performance deficiencies from human factors such as fatigue, illness or emotional problems.
 - C —Peer pressure, get-there-itis, loss of positional or situation awareness, and operating without adequate fuel reserves.
- 28.** When should pilots decline a “land and hold short” (LAHSO) clearance?
- A —When it will compromise safety.
 - B —If runway surface is contaminated.
 - C —Only when the tower controller concurs.
- 29.** What tolerances must be maintained in order to perform Slow Flight according to the Commercial Airman Certification Standards?
- A —Altitude must be lower than 1,500 feet AGL, and airspeed maintained at $1.2 V_{S1}$, $+10/-5$.
 - B —Airspeed must be just above stall speed with altitude maintained at ± 100 feet, and heading $\pm 10^\circ$.
 - C —Altitude must be no lower than 1,500 feet AGL, and altitude maintained at ± 50 feet, and heading $\pm 5^\circ$.
- 30.** What tolerances must be maintained to perform Stalls according to the Commercial Airman Certification Standards?
- A —Altitude must remain above 1,500 feet AGL, heading $\pm 10^\circ$, and recovery promptly made.
 - B —Altitude must remain above 3,000 feet AGL, heading $\pm 10^\circ$, and recovery promptly made.
 - C —Announces first indication of stall, maintains heading $\pm 15^\circ$, and recovers promptly.
- 31.** According to the Commercial Airman Certification Standards, a Steep Turn must be performed maintaining
- A —a coordinated 360° turn, with a 50° bank, ± 5 degrees, rolling out on the entry heading, $\pm 5^\circ$.
 - B —a 45° bank, $\pm 10^\circ$, while coordinating a 360° turn.
 - C — ± 100 feet, ± 10 knots, V_A or recommended entry speed, and coordination.
- 32.** According to the Commercial Airman Certification Standards, a Chandelle requires
- A —a coordinated 180° turn resulting in an air-speed approximately $1.2 V_{S1} \pm 5$ knots.
 - B —a coordinated 90° turn resulting in a full stall attitude.
 - C —a coordinated 180° turn resulting in an air-speed approximately $V_{S0} +5, -0$ knots.
- 33.** According to the Commercial Airman Certification Standards, Lazy eights require
- A —a constant pitch, bank, and turn rate.
 - B —a constantly changing pitch, bank, and turn rate.
 - C —a constant bank, airspeed, and power setting.
- 34.** According to the Commercial Airman Certification Standards, Eights-on-pylons require
- A —pylons which will permit approximately 3 to 5 seconds of straight-and-level flight between them.
 - B —maintaining altitude ± 100 feet, heading $\pm 10^\circ$, and airspeed ± 10 knots.
 - C —a pivotal altitude at least 1,500 feet AGL.